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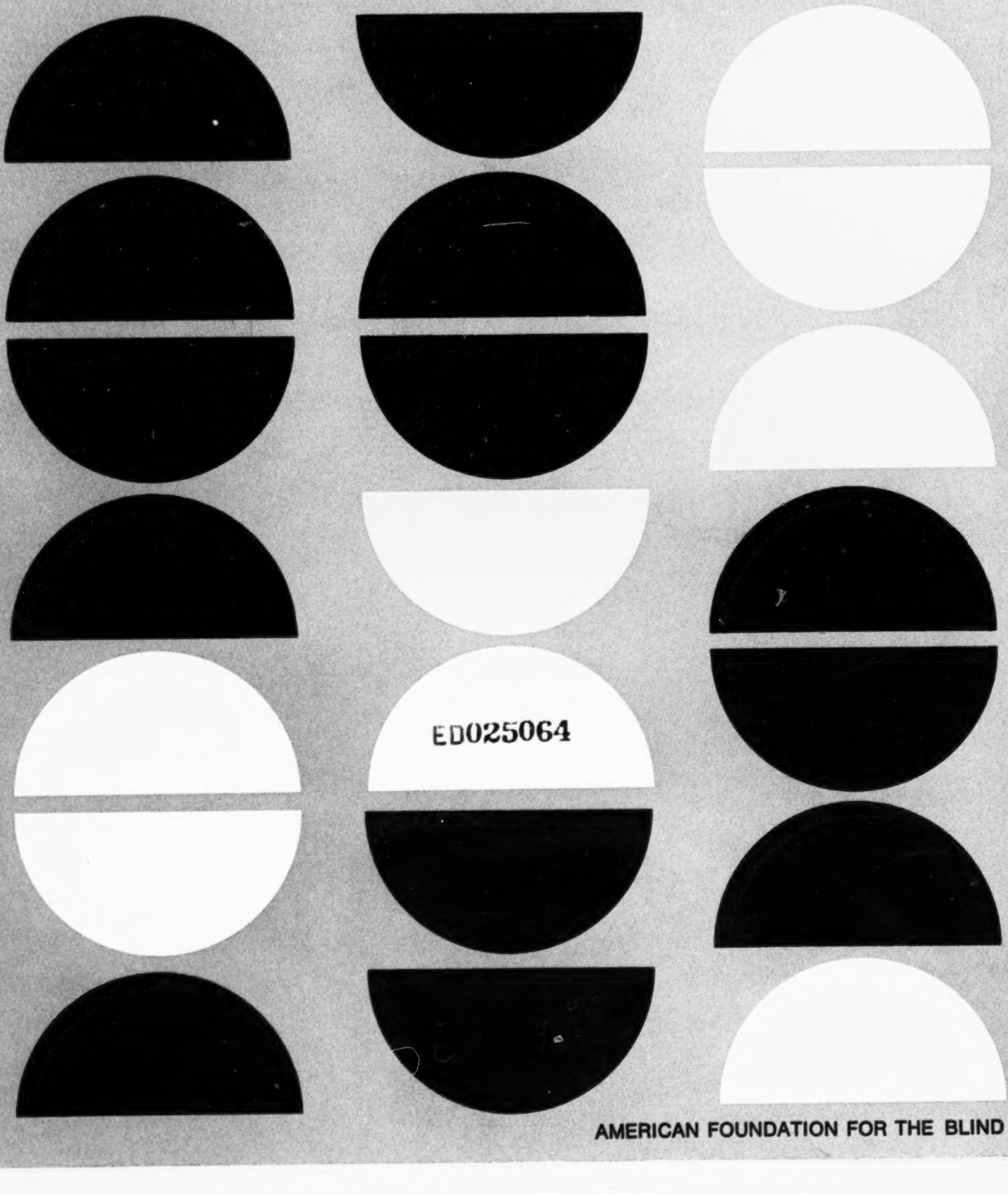
In 1966, a national survey reported on 8,887 multiply impaired (MI) blind children. About 56% were boys; 85% had been blind since before age 3, and half were totally blind. The principal causes of blindness were retrolental fibroplasia and congenital cataracts. Almost 63% had two or more additional disabilities (86.8% of those under age 6), such as mental retardation (80.2%), speech problems (38.9%), brain damage (35.1%), emotional problems (16.7%), cerebral palsy (14.4%), epilepsy (14.0%), chronic medical problems (7.0%), crippling (4.9%), hearing impairment (10.6%), cosmetic defect (6.1%), orthodontic defect (4.0%), and cleft palate (1.0%). Although half of the sample was 13 or older, only 4.4% functioned at secondary school level; 130 children were reported who had reading vision but used braille; the reported mobility performance data were found unreliable. The estimated number of MI blind children in the United States is 15,000 with 300 more diagnosed each year. Suggestions were made for research and services. (LE)

MULTIPLY IMPAIRED BLIND CHILDREN

a national problem



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Multiply-Impaired Blind Children: A National Problem

Milton D. Graham

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American Foundation for the Blind

Foreword

For some time concern about multiply-impaired blind children has been increasing; yet, little real information has been available about their number, the severity of their problems, and the types of care and education they require.

This study, undertaken in 1966, is an attempt to answer some of these questions. It shows clearly that the number of multiply-impaired children is rising, that their problems are severe, and that services for them are seriously lacking; but it also offers some suggestions for improving services.

It is our hope that all individuals and all schools and agencies concerned with multiply-impaired blind children will read this report and use it in their planning for services during the next few years.

M. Robert Barnett
Executive Director
American Foundation for the Blind

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1 Introduction

This is a report of a survey conducted by the Department of Research of the American Foundation for the Blind. The author feels obliged to state, at the outset, a conclusion: the survey, in his opinion, justifies the increasing expressions of concern for the welfare and education of multiply-impaired (MI) blind children. This concern is reflected, for example, in the work of a task force on handicapped children and child development in the Office of the Secretary of the Department of Health, Education, and Welfare (1). And the Vocational Rehabilitation Administration convened a symposium in 1967 and has supported service projects on the deaf-blind. The National Institute of Neurological Diseases and Blindness sponsored a special study of the incidence and prevalence of visual impairment due to recent rubella (German measles) epidemics (2). Among institutions actively serving considerable numbers of MI blind children are the Perkins School for the Blind, the Industrial Home for the Blind in Brooklyn, Syracuse University, the Oregon School for the Blind, the University of Michigan, and others. Recent publications include those of Wolf (3), Elonen (4), and Cicenia (5). Further, in 1966, the International Society for Rehabilitation of the Disabled undertook an international survey of technical aids for handicapped children including blind children from the International Information Center in Stockholm, Sweden.

The programs of these and other groups have been diverse. Some focused on incidence and prevalence statistics, some on epidemiology, some on treatment and training, some on corrective curricula, and others on work with the parents of MI blind children. All agreed that the problems of MI children are severe enough and probably frequent enough to warrant a national approach to possible programs for their welfare and education. Implicit is a feeling that enough is not being done for MI blind children and that evaluations, treatments, and training do not permit these children to attain their potential. Residential schools for the blind have been admitting more MI children, but staffs feel the strain and emphasize that the programs are inadequate—and perhaps never will be adequate. Despite this almost fatalistic mood, the American Foundation for the Blind called together in 1965 an ad hoc committee to discuss what might be done. The committee included:

Carl J. Davis, Head, Department of Psychology and Guidance, Perkins School for the Blind
John Walker Jones, Senior Program Specialist, Education of Handicapped in Institutions, Division of Compensatory Education, Department of Health, Education, and Welfare, Office of Education, Washington, D.C.
Dr. Eric Josephson, Research Director, Maternal and Child Health Program, Columbia School of Public Health and Administrative Medicine
The Very Reverend Richard M. McGuinness, Director, Mount Carmel Guild Center for the Blind
Miss Pauline Moor, Specialist in Education, Program Planning Department, AFB
Mrs. Ferne Root, Director, Association for the Help of Retarded Children (formerly, Director, Program Planning Department, AFB)
Dr. Edmund J. Rubin, psychologist, Morristown Memorial Hospital
Miss Josephine Taylor, Director of Educational Services, New Jersey Commission for the Blind
Mrs. Elizabeth Wagner, Specialist in services for deaf-blind children, AFB
Mr. Charles Woodcock, Superintendent, Oregon State School for the Blind

The committee advised that a logical first step was to conduct a national survey; funds were approved by the AFB Board of Trustees. A research assistant, Mrs. Rosanne Silberman, then a doctoral candidate at Teachers College, Columbia University, was employed on the project from November, 1965, to January, 1967. Wolf's questionnaire (3) was adapted, with considerable help from Dr. Edmund J. Rubin (then with the Mount Carmel Guild for the Blind, Newark, New Jersey), questionnaires were mailed out as described below, nonresponses followed up, inconsistencies and errors corrected by correspondence, returns coded, data reporting programs drawn up, and print-outs of marginals and cross-tabulations made, all under Mrs. Silberman's supervision. This report is based on these data as interpreted by the author, who received many helpful suggestions from readers of the draft manuscript.

LIMITATIONS OF THE DATA

The nonresearcher who is put off by the disclaimer, "limitations of the data," will, it is hoped, be indulgent in this instance. For the subject of this report is generally acknowledged to be complex and difficult.

First, we used a mail questionnaire to collect data, not the direct interview or telephone interview. Hence, differences of interpretation that an interviewer would have caught and corrected. For example, despite our efforts to define terms carefully on the instruction sheet which accompanied the questionnaire, some educators were confused by "neurotic," 'psychotic," and "autistic." Others used incorrect ophthalmological terms such as "nystagmatism," or reported "scar tissue, both eyes" as a cause of blindness when it is a condition, not a cause. Also, we question whether there was any consistency of interpretation of vague terms such as "travel vision" even though we tried to provide definitions.

When an IQ is reported as observed performance, not a test result — many MI blind children can't be tested — there are bound to be wide variations in what constitutes the "trainable only" category, the "possibly educable" category, the "provisionally educable" category, and so on. When ophthalmologists, pediatricians, psychologists, psychiatrists, and other specialist personnel participate in the evaluation, their diagnoses and biases are likely to prevail over the judgments of classroom teachers who work with the children daily.

If the data are of limited reliability, what good are they? Why bother with them, However limited, they are data based on a national sample and provide more information than we have had on MI blind children. The alternative, a carefully controlled research project on a national scale, would be prohibitive financially: MI blind children are even more widely scattered than "normal" blind children (6) and evaluations are far more complex and costly. So we present our results with the warning that can only report what was reported to us. Our conclusions and interpretations are hardly the final word; we expect them to be challenged.

WHO REPORTED?

We developed a mailing list of 1,063 addresses, representing all fifty states, Puerto Rico, the Virgin Islands, Guam, and the District of Columbia. Answers were received from every state, the District of Columbia, and Puerto Rico; with over half of the respondents in twenty states returning the questionnaire. (For types of respondents see Table 1.) This seems a remarkably good response for a "shotgun" approach; many of the 1,063 addressees either had no MI blind children in their institutions or referred our request to someone who did. There were very few outright refusals to cooperate. Some organizations and institutions explained that they did not have personnel to fill out the complicated questionnaire. Others had recently done studies or were in the process of making their own study and offered to share their data, which, of course, could not be included in our data.

Using two different rating systems, we agreed that the following states gave fullest reports in order of rank (the top quartile of the fifty states): Vermont, Delaware, Connecticut, Maryland, Wyoming, New Jersey, New Hampshire, Kansas, Louisiana, Oregon, Nebraska, New York, and Rhode Island. The ratings of all states can be found in Table 2 in Appendix 1. Reasons for incomplete returns include:

1. No reports from state institutions that might have had MI blind children (West Virginia, Idaho, Ohio, California, South Carolina, and South Dakota)
2. No reports from state schools for the blind (Tennessee, New Mexico, and Ohio which was not sent a questionnaire)

3. No state commissions and/or programs for MI children (Mississippi, West Virginia, South Carolina, New Mexico, and Tennessee)

Reports were received from 36 of 43 state schools for the blind. All institutions in 22 states responded; in eleven states some institutions reported; no reports came from institutions in thirteen states; institutions in four states inadvertently were not sent questionnaires. Very few local school districts that were sent questionnaires failed to report. (Table 1 shows the distribution of reports by types of organizations and institutions.)

Table 1

Types of Organizations and Institutions Reporting

	N	*Percentage of Reports*
Local board of education or school district	2,261	25.4
Residential school for the blind only	2,258	25.4
Private or state institution	1,727	19.4
State welfare or health department, commission for the blind, etc.	1,701	19.1
State education department	278	3.1
Voluntary agencies	262	2.9
Special residential school	181	2.0
Hospital or clinic	128	1.4
Unknown, unable to identify	91	1.3
TOTAL	**8,887**	**100.0**

We were pleased that all types of institutions and organizations cooperated to the extent that we can claim that we have significant data from all possible sources.

Representativeness of the Sample

How representative is our sample of 8,887 MI blind children? We estimate that it represents about two thirds of the MI blind children in the country. Calculating (7) by state reports, we estimate that the first quartile states (those giving most complete reports) are about 70 percent complete (see Table 2, Appendix 1), the second quartile states about 50 percent complete, and the remaining 24 states about 30 percent complete. It is most significant that eleven of the thirteen best reporting states are associated with the Model Reporting Area of the National Institute of Neurological Diseases and Blindness, a national biostatistical program based on registries of blind persons kept at state level and maintained by strict quality control agreed to by the member states.

As to completeness of reporting by age group, we estimate that the sample is 20 percent reported in the under-6-year group, about 75 percent in the 6-to-12 year group, about 80 percent complete in the 13-to-16 year group and about 90 percent complete in the 17-to-21-year group. These figures substantiate our estimate that MI blind children in schools of any kind are well reported and that MI blind children in institutions for custodial care were poorly reported.

As to age groups, we did not request data on preschool children because we could not think of a suitable method of collecting data: requesting information from thousands of clinics seemed a futile procedure. That we got as many under-6-year-olds as we did (529, or 6 percent of the sample) surprised us. Because so many of these children were reported by institutions, and, as we shall show later, because these children are severely impaired, we feel that the single group was poorly represented in the sample are the preschool MI blind children, whose needs are most severe. So if anything, our report on services needed is likely to be conservative because of this underrepresentation of the preschool group (8). With this important reservation, then, we believe that our sample of 8,887 is representative of MI blind children in the United States.

HOW MANY MI BLIND CHILDREN ARE THERE?

Rough calculation indicates that the sample of 8,887 constitutes about two thirds of the population of MI blind children (9), or that there are about 15,000 such children, the estimate made in 1965 by The Hope School for Blind Multiple-Handicapped Children (12). This constitutes a prevalence rate of 263 per 100,000. At present rates about 300 newly diagnosed MI blind children can be expected each year, which would mean about 18,000 such children by 1975. This figure is but an educated guess because at least two important reservations must be made: *(1)* it is impossible to estimate whether the trend toward saving more and more premature infants and the severity of rubella epidemics will continue at present levels or increase; *(2)* the life expectancy of an MI blind child committed to an institution for custodial care only is unknown, but there is some reason to believe that it is shorter than that of the noninstitutionalized MI blind child. Even with these reservations it seems likely that the absolute numbers of MI blind children will increase year by year. We shall discuss this point more thoroughly in the section on impairment.

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6. We used — and assume our respondents used — the usual definition for binocular visual impairment: 20/200 in the better eye when corrected, or a limitation of 20° or more of field vision. When another impairment (impairments are always permanent conditions), physical disfunction (see Table 15), or serious emotional or mental condition existed in addition to visual impairment, we considered the child multiply impaired. For mental retardation we used the following definition (but cannot claim that all our respondents did):

". . . mental retardation refers to subaverage intellectual functioning which originates during the developmental period and is associated with impairment in one or more of the following: (1) maturation, (2) learning, and (3) social adjustment. Later the conditions of maturation, learning, and social adjustment were replaced by the phrase 'adaptive behavior.' It is clear that such a definition cuts across all of the areas: medical, social, and psychological. In addition it presents mental retardation as a generic term (appropriate for any level of below normal mental functioning) and substitutes the levels of mild, moderate, *and* severe *as classifications to replace the older terms of* feebleminded *(or* moron*),* imbecile, *and* idiot."

From O. P. Kolstoe and R. M. Frey, *A High School Work-Study Program for Mentally Subnormal Students*, Carbondale and Edwardsville, Southern Illinois University Press, 1965.

7. Method of calculation was as follows. Using base figures provided by Table II of the NSPB *Fact Book* (see ref. 10 below), we divided the *N* reported to us by each state by the NSPB estimate of children in the state requiring eye care. The result was a quotient which was then rank ordered by quartiles. We verified our rough ordering by the results of reporting by the state of California which ranked very low in our estimates. The California report was 422 cases which resulted in a placement in the fourth quartile using the NSPB base figure. However, a year before a thorough survey had been conducted by Mr. William Simmons of the State Department of Public Health in which (see ref. 11 below) he enumerated 1,417 MI children. Recalculated with this number, California reporting was ranked in the first quartile. This tended to confirm our rough calculations, assuming, as we did, that the prevalence of MI blind children in various states is the same as the NSPB estimates of visually impaired children in all states. In other words, there is no reason to believe that any one state has a significantly larger proportion of MI blind children than any other state.

8. In the interest of completeness we consulted the Children's Bureau and were told that their data collections have limitations. Their maternal and child health reports are in their first year of collection. Data from the crippled children's program are not considered complete. Collecting of data from the mental retardation clinics has only just started and first reports will not be available until July, 1968. None of these collections has the rigorous statistical quality control required for definitive and reliable data.

9. Our calculations are based on our estimates that reports from the first quartile states were 70 percent complete, second quartile states 50 percent complete, and the remaining states 30 percent complete. The ranking by quartiles is explained in ref. 7 above.

10. The National Society for the Prevention of Blindness, Inc. "Table II, Estimated Cases of Glaucoma, School Children Needing Eye Care, Eye Injuries to School Children and Partially Seeing School Children, by State, 1965." New York, 1966.

11. L. L. Clark (ed.). *Proceedings of the West Coast Regional Conference on Research Related to Blind and Severely Visually Impaired Children.* New York, American Foundation for the Blind, 1965, pp 11-15.

12. Dale O'Brien & Company. *A Fact Sheet on the Hope School for Blind Multiple-Handicapped Children*, Chicago. Ill. No date.

2 Demographic Statistics and Physical Conditions

SEX

Of the 8,887 MI blind children in the sample, 4,994 (56.2 percent) are boys, 3,886 (43.7 percent) are girls, and there is no information on 7 (0.1 percent). National percentages for this age group are 50.7, male and 49.3, female (1). A partial explanation for the differences in the MI blind sample is the accepted theory that there are larger injury rates for males at birth.

AGE

Five hundred twenty-nine (6 percent), are under 6; 3,834 (43.1 percent) are 6 to 12; 3,072 (34.6 percent) are 13 to 16; and 1,450 (16.3 percent) are 17 to 21. Ages of two are unknown. Table 3 below gives birth years of the MI blind sample.

Table 3

Year of Birth of MI Blind Sample

Year	N	*Percentage*
1966	4	0.1
1965	20	0.2
1964	68	0.8
1963	85	1.0
1962	97	1.1
1961	149	1.7
1960	235	2.6
1959	356	4.0
1958	511	5.7
1957	526	5.9
1956	555	6.2
1955	563	6.3
1954	741	8.3
1953	935	10.5
1952	896	10.1
1951	762	8.6
1950	640	7.2
1949	531	6.0
1948	438	4.9
1947	377	4.2
1946	231	2.6
1945	139	1.6
1944	26	0.3
No response	2	0.0
TOTAL	**8,887**	**99.9**

6/7

The peak years of 1950 through 1954 can be attributed to retrolental fibroplasia cases. The small numbers of under 6 year olds is undoubtedly due to underreporting rather than decreasing rates. When compared with national statistics, 6.0 percent of the MI blind sample are in the 0-to-5-year group, while the national distribution for the 0-to-4-year group is 28.0 percent; 77.7 percent of the MI blind sample are in the 6-to-16-year group vs 67.6 percent in the 5-to-14-year group nationally; and 16.3 percent of the MI blind sample are in the 17-to-21-year group against 21.3 percent in the 15-to-19-year group nationally (1).

These figures illustrate the striking underrepresentation of the under 6 year olds; instead of being one quarter of the percentage of the national distribution, this segment of the MI blind sample should probably exceed the national percentage. It can be assumed that many of the 0-to-6 age age group in the MI blind sample were premature children, more so than in the national population. The 6.0 percent reported were largely in institutions; most likely not reported to us were many non-institutionalized, nonschool children. What their characteristics are we can only guess.

AGE AT ONSET OF VISUAL IMPAIRMENT

Table 4 shows that 83.3 percent of the sample have been blind since before 3 years of age and that most of these are totally blind. This poses very definite educational problems because it is generally accepted that visual loss before age 3 complicates learning processes, particularly perception and conceptualization: a child who cannot see the moon must learn about it by verbal presentation.

Table 4

Age at Onset of Visual Impairment for MI Blind Sample

Age	N	*Percentage*
Birth	4,415	49.7
Before age 3	2,990	33.6
After age 3	581	6.5
Other (unknown, impossible to determine, no response)	901	10.2
TOTAL	**8,887**	**100.0**

There are no comparable national estimates of blind and severely visually impaired children broken down by blind from birth, blind before 3 and blind after 3 (2).

CHARACTERISTICS OF VISUAL IMPAIRMENT

About half (48.5 percent) of the sample are totally blind. The others have severe visual impairment: 13.9 percent have travel vision; 36.1 percent have reading vision; for 1.5 percent there are no data.

Tables 5 through 7 in Appendix 1 list the causes reported for 87.5 percent of the sample; causes for the other 12.5 percent are unknown or impossible to determine from the reports. As might be expected, the two principal causes are retrolental fibroplasia (26.4 percent) and congenital cataracts (10.6 percent). The age groupings of retrolental fibroplasia cases are under 6 years, $N = 26$, or

1.1 percent; 6 to 12, $N = 804$, or 34.2 percent; 13 to 16, $N = 1{,}192$, or 50.7 percent; and 17 to 21, $N = 328$, or 13.9 percent. For several years educational and other training facilities for children can expect this large group to be expecting services.

The small number of rubella cases reported ($N = 122$, or 1.4 percent) is surprising in view of the fact that the National Institute of Neurological Diseases and Blindness estimates that there are 3,000 to 5,000 children visually impaired by rubella (3). The serious underreporting of the under 6 year olds in the MI blind sample and inability to diagnose the rubella syndrome probably account for our rubella data. Public education about rubella is certainly needed. Percentage distribution of other principal causes of blindness will be found in Tables 5 through 7 in Appendix 1.

Tables 5 through 7 raise questions that only can be noted in passing; the data permit nothing else. In general, there is reason to question how accurate the diagnoses are. Specifically, errors of refraction are not a *cause* of blindness but a correctible condition ($N = 433$, or 4.9 percent. It is not absolutely certain that all respondents reported only binocular vision impairment. Also, that there are as many as 1,112 children (12.5 percent of the sample) with "unknown" causes is unfortunate. Reporting of causes of blindness is notoriously faulty. Instruction in the use of the standard classification of causes of blindness is certainly needed (4).

ADDITIONAL DISABILITIES OF THE MI BLIND SAMPLE

Table 8 is the summary table of all other disabilities in addition to blindness and severe visual impairment. Each will be discussed in detail.

Table 8

Additional Impairments in Rank Order of Frequency of MI Blind Sample (N = 8,887)

Disability	*Blind Sample*		*Only Additional Impairment*	
	N	%	N	%
Mental retardation	7,131	80.2	2,247	25.3
Speech	3,457	38.9	134	1.5
Brain damage	3,116	35.1	91	1.0
Emotional problems	1,479	16.6	222	2.5
Cerebral palsy	1,279	14.4	102	1.1
Epilepsy	1,248	14.0	68	0.8
Crippling or medical	1,055	11.9	197	2.2
Chronic medical	621	7.0		
Crippling	434	4.9		
Hearing impairment	946	10.6	121	1.4
Cosmetic defect	543	6.1	76	0.9
Orthodontic defect	368	4.1	38	0.4
Cleft palate	89	1.0	5	0.1
TOTAL			**3,301**	**37.2**

This table points up three important characteristics of the MI blind sample: (*1*) About two thirds of the sample have, in addition to visual impairment, another severe impairment or condition. (*2*) Mental retardation is reported for the large majority (80.2 percent) of the sample. (*3*) Mental retardation is often accompanied by impairments other than blindness) and other severe conditions. Each of these disabilities is discussed in detail.

Figure 1 (see Appendix 2) portrays graphically the same data—40.4 percent of the sample have three or more impairments (by definition these are permanent conditions) and 51.0 percent of the totally blind have three or more impairments. Both figures illustrate the severity of the disabilities of a large number of the sample.

ADDITIONAL PHYSICAL IMPAIRMENTS AND CONDITIONS

Hearing. Tables 9 through 11 give characteristics of all MI blind children with hearing as an additional impairment (*N* =946, or 10.6 percent).

The 805 (10.9 percent) born blind or blind before age 3 and deaf or hard of hearing present a special problem to all dealing with them because they have no visual memory and have special communication problems (5). Several special programs have been devised to deal with such deaf-blind children (6, 7, 8). The general success of these and other programs for the deaf-blind have encouraged federal government supported programs which are now largely in the planning stage (9). These plans represent one of the brightest spots in a generally gloomy picture of neglect and inadequate care of MI blind children.

Cerebral palsy. Tables 12 through 14 give characteristics of MI blind children with the additional physical impairment of cerebral palsy (*N* =1,279, or 14.4 percent). The group grossly affected (725, or 8.2 percent) poses special problems, especially in orientation and mobility. Even more special are the problems of that group grossly affected and totally blind — the 471, or 11.0 percent, of the totally blind sample.

It can be assumed that most of the group with cerebral palsy as an impairment in addition to blindness will also have other physical conditions: all the grossly affected and many of the mildly affected are known to have additional impairments. Little has been done for this severely impaired group in the way of special programs, although there is some awareness of their problems (10).

Epilepsy. Tables 15 through 17 give characteristics of MI blind children with epilepsy as an additional physical impairment (*N* =1,248, or 14.0 percent). The special problem group is undoubtedly those who require drug control—*N* = 663, or 7.5 percent. This group should be studied as to the need for drug control, dosages, and additional disabilities. While it is recognized that drug control is necessary for some, it has been said that some institutions keep some MI blind children under heavy sedation at all times whether or not drug control is justified. For instance, is drug control warranted for the "disruptive child"?

Brain damage. Tables 18 through 20 give characteristics of MI blind children with brain damage as an additional physical impairment (*N* =3,116, or 35.1 percent). The extraordinary figure of this distribution is the prevalence of brain damage in the under-6-year-old group — double that of any other age group. This can be explained in part by the confusion in defining brain damage and the increasing numbers of premature children being saved. We also suspect from our own experience that the electroencephalogram (EEG) is being misused as a diagnostic instrument to determine brain damage in blind children. Research in this country (11), Britain (12), France (13), and the USSR (14) makes it clear that normal EEG readings for blind children are quite different from readings for sighted children. Most of these findings are not yet in print in English, but will be within the next year, at which time the subject of committing blind children to institutions for custodial care on the basis of an EEG should be thoroughly aired. These MI blind children have been especially discriminative against and deserve better treatment.

Miscellaneous additional physical impairments and physical conditions. Tables 21 through 24 give characteristics of MI blind children with congenital abnormalities (*N* = 434, or 4.9 percent), chronic medical problems ($N = 621$, or 7.0 percent), special congenital anomalies ($N = 352$, or 4.0 percent), cleft palate ($N = 89$, or 1.0 percent), orthodontic defects ($N = 368$, or 4.1 percent), and cosmetic defects ($N = 543$, or 6.1 percent). One figure is worth noting in this distribution: the proportion of congenital anomalies is much higher among the under-6-year-olds, reinforcing our earlier suspicion that many of this group are premature children with multiple impairments from birth.

While the prevalence of the physical impairments and conditions listed in Tables 21 through 24 are low, they are important in a multiply-impaired group. For instance, a cosmetic defect added to blindness and motor problems can greatly affect social acceptance. It seems futile to say that one impairment or condition is more severe than another; the emphasis should be on the child's total functioning. Yet adequate diagnosis and treatment have sometimes been denied in the "primacy of handicap" argument that is more concerned in whether blindness or some other impairment or condition is the "prime" handicap (15).

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3 Findings: Other Disabilities and Disfunctions

SPEECH PROBLEMS

Tables 25 through 27 give characteristics of the MI blind sample with speech problems an an additional disfunction ($N = 3{,}457$, or 38.9 percent). That one third of the totally blind sample have no original language (or verbal communication) points up the severity of the problems of the whole group. As might be expected, there is proportionately much more lack of language among the under 6 year olds than in the other age groups. How much structural defect or functional disability and how much emotional disorders contribute to speech defects and lack of speech among the sample is not known because we did not request the information and it is impossible to estimate even roughly.

Although the problems of teaching speech are severe, they are not insoluble: there is nothing different in the speech development of an MI blind child and other children (1), with the exceptions of the brain-damaged child or the congenital deaf-blind who has never heard speech. Speech develops more slowly because visual input is lacking, but once begun, follows a normal pattern (2). Speech training is difficult for the severely retarded and the severely emotionally disturbed, but the experiments of Dr. O. K. Moore with these groups have given some hope even for them (3).

EMOTIONAL DISORDERS

Tables 28 through 30 give the characteristics of the MI blind sample with emotional disorders as an additional disfunction ($N = 1{,}479$, or 16.7 percent). The data on emotional disorders are of limited usefulness because they are largely reports of observed behavior submitted by teachers who are unfamiliar with this particular terminology. Because of the severity of their condition, it seems likely to us that there are more emotional disorders in the MI blind sample than were reported, especially among the under 6 year olds. Again, training and educating the severely emotionally disturbed blind child is not impossible as Brodey (4), Frostig (5), and others have demonstrated. Costly programs are required and there is no certainty of desired results, both of which conditions have militated against the setting up of the necessary psychological and psychiatric services in depth for severely disturbed MI blind children.

MENTAL RETARDATION (6)

Tables 31 through 33 and Figures 2 and 3 (see Appendix 2) give the characteristics of the MI blind sample with mental retardation (MR) as an additional condition ($N = 7{,}131$, or 80.2 percent).

Three points deserve discussion: *(1)* the high prevalence of MR in the sample; *(2)* the relation of degree of vision to MR; and *(3)* the relation of age to MR.

Even taking into account the difficulties of testing and the lack of adequate tests, the exceptionally high MR rate among the MI blind sample is difficult to explain, since it is so much higher than any previously reported figure. For example, Wolf found only 25 percent MR in the 48 residential schools for the blind that he studied (7). Undoubtedly, that part of the MI blind sample in private or state institutions ($N = 1{,}727$, or 19.4 percent) has very high MR rates. Also it can be assumed that despite our instructions on the questionnaire, IQ tests or social quotient tests were not available for all the sample, and ratings were made on the basis of observed performance, which could introduce a great deal of variation in results reported. Furthermore, Wolf reminds us that too many schools and institutions rely solely on the IQ score to determine MR and also that the IQ is an unstable measure at best. For all of these reasons, we question the reliability of the very high MR rate in the MI blind sample but find any reasonable adjustment impossible. Our figures, as do most other MR figures, merely reflect the confusion in the field.

The relationship of degree of vision to MR raises another important point. The amount of total blindness (77.6 percent) in the below 25 IQ group of the MI blind sample falls to 32.2 percent in the 76 to 90 IQ group. We feel that some—perhaps a lot—of the MR reported is really pseudoretardation resulting from understimulation. This controversy has been with us a long time and only recently have reliable data been obtained concerning it. As early as 1931, Dry and Cooper posed the question: "feebleminded or only underdeveloped" (8). Hallenbeck (9), Moor (10), and others repeated the question over the years, but only recently have Woodcock (11), Brodey (4), and Elonen (12) given systematic study and incontrovertible proof that retarded-type functioning may come from lack of sufficient stimulation and that with proper programs the functional level of a retarded child can be significantly raised. The crux of the matter is the proper program. Very few of the 51 special programs reported by Wolf have been evaluated for their effectiveness, but we doubt whether many take the total environmental and developmental problems into account to the extent that is necessary.

Another important relationship in the MI blind sample is age grouping and reported MR. Of the 529 children in the under-6-year-old group, 225, or 48.2 percent, are in the under-25-IQ group, which is about triple the rate in the other age groups. Most of these children are in institutions for custodial care only. We can only repeat some of the arguments above. We question how the ratings were arrived at, and we suspect a good deal of pseudoretardation arising from lack of stimulation.

SUMMARY OF PHYSICAL IMPAIRMENTS AND OTHER DISFUNCTIONS

Table 34 summarizes all of the foregoing impairments and disfunctions of the MI blind sample. Tables 35 through 37 offer cross-tabulations. All these tables (34 through 37) show how severely impaired the MI blind sample is: 62.9 percent have two or more conditions in addition to visual loss. Of the totally blind group 72.0 percent have two or more additional conditions, and of those blind from birth 61.7 percent have two or more additional conditions. The other significant figure is that 86.8 percent of the 529 under 6 year olds have two or more additional handicaps.

Before going on to discuss the over-all implications of these physical impairments and disfunctions, we shall consider some data primarily of interest to educators.

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4 Findings: Educational Data

READING GRADE LEVELS

Tables 38 through 40 show the reading grade levels reported for the MI blind sample. The retardation of the MI blind sample is quite apparent. Although half are 13 years old or older, only 4.4 percent are functioning at a secondary level. The extent of the educational problem clearly calls for a national effort to determine whether the evaluation of this group has been adequate and whether it is possible to raise the group's reading level.

PRINCIPAL MODE OF READING

Tables 41 through 43 present the principal mode of reading reported for the MI blind sample. Two points seem worth noting: first, the lack of records and tapes used, and second, the unexplained number of braille users with vision. As to the lack of records and tapes, a recent unpublished educational materials survey conducted by the AFB Department of Research verifies the general shortage of records and especially of tapes as instructional materials. Further, most of the educators reporting wished that the shortage could be ended. Certainly with MI blind children every educational aid possible should be used. Tapes might be particularly helpful in speech training considering how successful Moore's experimental work has been (1) and the fact that many MI blind children learn only by listening.

The fact that 130 children of the MI blind sample are reported as having reading vision and use braille as their principal mode of reading is unexplained. In some cases deteriorating vision may afford an excuse, but most likely this situation represents a now outdated policy to teach braille to all severely visually impaired children whether they can read print or not.

MOBILITY PERFORMANCE

The reported mobility performance of the MI blind sample raises more questions than it answers. We believe the data to be statistically unreliable because we think that the respondents answered with different definitions of mobility in mind and that many of them were speaking only within the context of the performance of the child in a school situation. The whole subject of mobility and proper instruction for blind children with different physical capabilities and motivation needs to be thoroughly studied, and guidelines must be established for programs of instruction.

We can find little evidence that the principal components of mobility (for example, spatial orientation) are taught either extensively or with proper rigor; the scientific literature to aid such instruction is both sparse and inconclusive. The instruction that Walker reports (2) in many schools can hardly qualify as rigorous training courses. Summer courses stressing precane sensory training are laudable but cannot be called extensive throughout the country. The few metropolitan centers and residential schools that sponsor intensive mobility training for preadolescents cannot be expected to meet the national problem that exists with blind and severely visually impaired children without multiple impairments, much less the population that is the subject of this report.

The findings of a very recent experimental study on the teaching of spatial orientation to blind children (3) suggest that much can be done to improve their mobility performance and that intelligence as measured by the IQ is not a significant factor in such training. (Other studies have made the same finding.) This means that many MI blind children with mental retardation and/or some nonstructural defect in addition to visual impairment might be taught successful independent travel.

Looking further at the data on mobility performance reported on the MI blind sample we cannot explain to our satisfaction why the no-information rate is so high. ("No responses" plus "impossible to determine" plus "too young to determine" add up to $N = 1{,}419$, or 16.0 percent). Also, we have no information as to whether the nonambulatory cases reported ($N = 763$, or 8.6 percent) have psychological or structural causes.

In conclusion, we believe that the mobility performance reported for the MI blind sample is both fragmentary and statistically unreliable. It confirms our contention that the whole problem of mobility instruction for blind and severely impaired children (including the MI blind) should be given much more attention. It is one of the two principal problems (with reading) that all visually impaired persons must solve (if only partially) if they are to have any degree of independence for themselves. More pointedly, the distinct possibly that intelligence and mobility performance are not significantly related offers a unique opportunity to provide the MI blind child with more independence than has generally been considered possible.

In summary, we believe that the MI blind sample's mobility performance and possibly reading performance could be bettered if intensive systematic training and all appropriate aids to better those performances were used. Nothing short of remedial programs on a national scale can improve the lot of these children.

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5 Implications of the Data

We believe that the estimated 15,000 MI blind children pose a national problem that can only be met by a massive national effort to provide services and training. We believe that many if not most of these children can be helped to improve their lot, as Woodcock at the Oregon State School for the Blind and others have proved.

Some rational system of early detection of MI children needs to be set up, especially among premature children (defined by the World Health Organization as a viable fetus weighing 2,500 gm. or less). It is not coincidental that eleven of the thirteen states giving the most complete data on this survey are associated with the Model Reporting Area for Blindness Statistics of the National Institute of Neurological Diseases and Blindness which systemizes epidemiological statistics. A register of MI blind children—or of all MI children for that matter—could be maintained nationally.

Early detection means early referral for services which could significantly lessen the impact of of his disabilities on the MI child. With early diagnosis and corrective surgery and/or therapy, many MI children could be kept from commitment to institutions where, as long as they live, they will receive custodial care only. In California 25 percent of all blind children have been committed to an institution; the proportion in the MI blind sample is 19.4 percent.

Commitment procedures in general need to be studied, particularly the use of IQ to prove mental retardation and the EEG to prove brain damage. The human costs and the financial costs of commitment also need to be studied. The life expectancy of a very young child—and the increase of premature babies is likely to continue—who is institutionalized should be estimated. The use of drugs for heavy sedation and physical restraints used occasionally on "disruptive" children in institutions should be investigated.

We believe that one of the principal causes of resorting to institutionalization as a makeshift answer to meet the needs of many MI blind children is the general misconception that the number of blind children is decreasing because retrolental fibroplasia is no longer a principal cause of blindness (only 4.9 percent of the MI blind sample under 6 years old were blinded by retrolental fibroplasia). First, blindness is a function of population: the more children that are born, the more blind children before the age of 3 there will be. Incidence rates may decrease as medical science advances, but absolute numbers of MI blind children will not. If this were publicly acknowledged, there might be more incentive to do something about MI blind children besides putting them away in institutions. Counseling of parents and special programs by local and regional agencies and/or institutions might well save many MI blind children from institutionalization. We do not believe that institutionalization per se is wrong; some children can benefit only from custodial care. We urge that only such children be committed, and that those capable of self-care, independence of mobility, and some learning be given the opportunity to develop their capabilities.

The public should be informed about the extent of the problems of the MI blind child. For example, the Communicable Disease Center of the National Institute of Neurological Diseases and Blindness should release a full report on the rubella epidemics of 1964-65 so that others can decide whether a special survey is needed. If there are 3,000 to 5,000 such children as they estimate, we need to know a good deal more about them if services are to be planned for them (1).

Planning of services for all MI blind children is badly needed. Recently, efforts at a national level have been started for deaf-blind children; commendable private programs such as that of Perkins School for the Blind and six other centers could not meet national needs. This sort of national effort needs to be extended to all categories of MI blind children.

Several problems demand special attention. The whole matter of increasing sensory input to stimulate the MI blind child more should be systematically explored and guidelines set forth for programs to accomplish it. Speech training should follow the normal developmental pattern for all children. Mobility and daily living skills should be taught as early as possible so the child has some control of his environment; training in the use of the remaining senses, especially hearing, and use of technological aids should be included in mobility programs. Emotional disorders should be understood by everyone concerned with the MI blind child's day: his teachers, his parents and/or his houseparents; his physician and nurse, the dining room managers, and so on. The academic level of the MI blind child should be kept as nearly as possible to the level expected of the normal child.

Such programs require rigorously trained personnel, particularly the physician, the psychologist, and the teacher. It is generally acknowledged that the need for teachers is acute. But what kinds are needed? Wolf (2) has listed the traits of a good teacher of MI blind children for their "enormously taxing and in some ways demoralizing job" (3). In residential schools for the blind Wolf found the "... teachers of special classes were fairly well qualified. More than four fifths had a baccalaureate degree, and two fifths had a master's degree. Three fourths were recruited primarily from teachers of the blind, and four fifths chose to teach mentally retarded blind children. As a group, these teachers had almost four times more experience teaching blind children and twice as much course work in blindness than in mental retardation. The average teacher of the mentally retarded blind had eleven years of teaching experience."

Then he goes on to say that "... approximately 50 percent of the teachers of mentally retarded blind children felt inadequately prepared for their present teaching assignment; 82 percent believed that additional training in mental retardation, child development, and blindness would be most beneficial. The teachers also expressed a need for in-service training on the mentally retarded blind child. In-service education courses related to mental retardation, blindness, and child development appear to offer some possibilities for the professional growth of special class teachers." Obviously, when they are coping fairly well with the problems of the MI blind child, teachers are somewhat dissatisfied with their effectiveness. In addition to a stable, supportive personality the teacher of the MI blind child should have a master's degree in child development and ten years' experience teaching both sighted and blind children before teaching MI blind children (4).

Except for the degree, the same qualifications might be applied in a residential setting to the houseparents who play a critical role in preparing the child to take care of himself both physically and emotionally.

How many teachers and houseparents are needed to give the necessary care and training that we envisage? There are few estimates to help us answer this question. Wolf found that the pupil-teacher ratio of the fifty special teachers in the 48 residential schools that he studied was 8.6 to 1. This ratio appears to us to be much too high, based on our limited data of the MI blind sample. While there is no way of knowing the extent of the severity of impairment and disfunction in the groups surveyed, we suspect that systematic attempts to match severity of children's needs and manpower needs were made in very few places.

We were impressed by the viability of a rating scale to determine teaching load used by the Oregon State School for the Blind. (The scale is discussed at length in Appendix 3.) Their assumption is that the average teacher of blind children without additional disfunctions or conditions can comfortably handle ten children. Employing an indexing system commonly used in the social sciences, weights were assigned to all impairments, disfunctions, and conditions and a total score arrived at. For example, blindness was given a weight of 6; a blind child with no additional disfunctions would therefore get a severity score of 6 and an average teacher could handle 60 points or 10 such children comfortably. A child who is blind (6 points) from birth (2 points), deaf (6 points), neurotic (4 points), and, being deaf, with defective speech (2 points) has a total score of 20 points. An average teacher could be expected to handle three such children comfortably. (In practice, the field accepts a 2-to-1 ratio for deaf-blind children.) There are many flaws in such a scale, but used cautiously it offers promise for a rough approximation of required teaching staff. With the 1965 annual reports of the Maryland School for the Blind and the Perkins School for the Blind before us, we applied the severity rating scale to the reports that they had sent us on the MI blind survey. We estimated that Maryland, with 27 percent of its student body of 300 being MI children, should have about 45 teachers; actually they had 46 teachers and their over-all staff ratio was 1 to 3. For Perkins, with 44 percent of its student body of 300 being MI children, we estimated a staff of 71 teachers; actually they had 72 teachers and their over-all staff ratio was 1 to 2.

These examples suggested to us that the Oregon scale, which is being used there to determine teacher load with an experimental group of very severely impaired MI children, is useful. The important thing is that the experimental program provided for these twelve children the last two years has resulted in remarkable progress on the part of the group; one child brought in as nonambulatory and with many complications progressed enough to go home and into a public school setting within two years.

Any program planning for the MI blind sample would be considerably overoptimistic and less than helpful if it set forth only a two-year plan, however. An experimental assessment as to whether an MI blind child can benefit from a program such as we envisage might take four to five years for most of the MI blind population. For the noninstitutionalized MI blind population of 10,000 to 12,000 children with an average severity rating of 20 points (several schools averaged about that on the reports sent us), something like 3,500 to 4,000 teachers might be needed to handle the academic needs of the group. This is about 1 percent of what the estimated need is for all groups of handicapped children (5). Assuming that $5,000 might give a teacher the extra training that he needs, a 17.5 to 20 million dollar budget might be adequate for the academic program.

As to supporting staff (supervisory staff, houseparents, specialist consultants) there are no comparable guidelines, though in the Maryland and Oregon Schools for the Blind and Perkins, teaching staff and nonteaching staff about the same number (6). Perhaps 50 million dollars a year for five years would adequately finance an experimental program to determine the needs of MI blind children in this country.

Some existing experimental programs cost about $5,000 per MI blind child per year. The Hope School for Blind Multiple-Handicapped Children estimates its cost at $7,000 per child per year (7). For the noninstitutionalized MI blind population, the $5,000 figure would mean a budget of 50 to 60 million dollars per year; the $7,000 figure, 70 to 84 million a year. If the institutionalized children were to be added, a budget of 75 million per year would probably not be unrealistic.

We put forth these estimates only for purposes of discussion. They are our best guess about a thoroughly nebulous situation. But if we are anywhere near the mark, 4,000 special teachers plus supporting personnel for an outlay of 50 to 75 million dollars a year for 12,000 to 15,000 MI blind children does not seem excessive, particularly if a five-year experimental program succeeds in turning even half of the group into independent and productive human beings. We look at it this way: if 1 in 4 of all MI blind children are going to continue to be institutionalized — and this might be a very conservative estimate—and each institutionalized child costs, say $3,000 a year to maintain (charges range for sighted MR patients from $1,061 a year in Mississippi to $4,008 in Kansas according to the National Association for Retarded Children), the cost to the nation is 12 million a year for them alone, and if each child lives ten years in an institution the cost is in the magnitude of 120 million in the next decade. How much better it would be to initiate an experimental program that might provide productive human beings at considerably more cost per year but only twice the financial cost over a decade.

In summary, the limitations of the data of the MI blind survey are such that we know only definitely that we have a national problem. As to specific recommendations, we can only *suggest* several for the MI blind population. We believe that intensive social and psychological research is needed on *(1)* effective ways of multisensory stimulation; *(2)* effective mobility training techniques; *(3)* effective auditory training techniques for "nonreaders"; and *(4)* maintenance of a national register of MI blind children. We are not competent to comment on medical research, but early detection and referral, more frequent and more accurate diagnoses, and guidelines for paramedical personnel are suggested by the data.

Services that appear to be needed include *(1)* regional planning for facilities for training; *(2)* more effective and more extensive training of teachers, using teachers from other handicap areas in a team approach, and so on; *(3)* more and better trained ancillary personnel such as houseparents; and *(4)* most of all, a national plan to deal with the problems of the estimated MI blind population of 15,000 children.

We believe that the problem of MI blind children is manageable. The existing experimental programs offer hope that many if not most MI blind children can be taught to cope more successfully with life despite their impairments and disfunctions. Costs do not seem excessive by current standards, and interest in the problem is running high. Perhaps a national conference is in order to consider what might be done. We offer this report in that hope.

References

1. Particularly worth watching will be the effectiveness of prevention programs using the very recent "rubella immunity test and the first effective experimental vaccine against rubella now being used extensively in clinical trials in this country and abroad" according to an HEW press release (S24) of October 24, 1967. The test and vaccine were developed by Dr. H.M. Meyer, Jr. and Dr. P.D. Parkman of the Division of Biologics Standards, National Institutes of Health.

Appendix 1
Tables

Table 1

Types of Organizations and Institutions Reporting

	N	*Percentage of Reports*
Local board of education or school district	2,261	25.4
Residential school for the blind only	2,258	25.4
Private or state institution	1,727	19.4
State welfare or health department, commission for the blind, etc.	1,701	19.1
State education department	278	3.1
Voluntary agencies	262	2.9
Special residential school	181	2.0
Hospital or clinic	128	1.4
Unknown, unable to identify	91	1.3
TOTAL	**8,887**	**100.0**

Table 2

Estimated Completeness of Reporting by States

(in order of rank of completeness)

Quartile 1 (most complete)	*Quartile 2*	*Quartile 3*	*Quartile 4* (least complete)
Vermont	Maine	Arkansas	Tennessee
Delaware	Washington	Missouri	Kentucky
Connecticut	Pennsylvania	Montana	New Mexico
Maryland	Iowa	North Carolina	South Dakota
Wyoming	Georgia	Oklahoma	South Carolina
New Jersey	Colorado	Minnesota	California
New Hampshire	Michigan	Wisconsin	Alabama
Kansas	Utah	Hawaii	Ohio
Louisiana	Texas	Indiana	Idaho
Oregon	Florida	North Dakota	West Virginia
Nebraska	Illinois	Arizona	Alaska
New York	Massachusetts	District of Columbia	Mississippi
Rhode Island	Virginia	Nevada	

Table 3

Year of Birth of MI Blind Sample

Year	N	*Percentage*
1966	4	0.1
1965	20	0.2
1964	68	0.8
1963	85	1.0
1962	97	1.1
1961	149	1.7
1960	235	2.6
1959	356	4.0
1958	511	5.7
1957	526	5.9
1956	555	6.2
1955	563	6.3
1954	741	8.3
1953	935	10.5
1952	896	10.1
1951	762	8.6
1950	640	7.2
1949	531	6.0
1948	438	4.9
1947	377	4.2
1946	231	2.6
1945	139	1.6
1944	26	0.3
1943	2	—
TOTAL	**8,887**	**99.9**

Table 4

Age at Onset of Visual Impairment for MI Blind Sample

Age	N	*Percentage*
Birth	4,415	49.7
Before age 3	2,990	33.6
After age 3	581	6.5
Other (unknown, impossible to determine, no response)	901	10.2
TOTAL	**8,887**	**100.0**

Table 5

Principal Causes of Blindness and Degree of Vision (N = 8,887)

Main Causes of Blindness			*Totally Blind* (N = 4,309)		*Travel Vision* (N = 1,233)		*Reading Vision* (N = 3,213)	
	N	%	N	%	N	%	N	%
Optic atrophy	682	7.7	259	6.0	128	10.4	271	8.4
RLF	2,350	26.4	1,841	42.7	169	13.7	320	9.9
Congenital cataracts	942	10.6	240	5.6	212	17.2	466	14.5
Errors of refraction*	433	4.9	13	0.3	34	2.8	382	11.9
Other diseases of retina (not RLF or retinoblastoma)	496	5.6	135	3.1	91	7.4	262	8.1
Congenital defects—not already specified	320	3.6	178	4.1	47	3.8	94	2.9
Cerebral embolism and affection of cortical visual center	252	2.8	136	3.2	37	3.0	73	2.3
Congenital glaucoma	243	2.7	119	2.8	40	3.2	79	2.5
Rubella	122	1.4	42	1.0	43	3.5	33	1.0
Nystagmus	190	2.1	19	0.4	21	1.7	149	4.6
Amblyopia	215	2.4	33	0.8	31	2.5	147	4.6
Unknown, impossible to detect, no response	1,112	12.5	605	14.0	139	11.3	356	11.1
TOTAL	**7,357**	**82.7**	**3,617**	**84.0**	**992**	**80.5**	**2,632**	**81.8**

*Errors of refraction are not a *cause* of blindness, but a condition. It is listed here because it has been reported to us.

Table 6

Principal Causes of Blindness and Age (N = 8,887)

Main Causes of Blindness			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Optic atrophy	682	7.7	38	7.2	320	8.3	180	5.9	144	9.9
RLF	2,350	26.4	26	4.9	804	21.0	1,192	38.8	328	22.6
Congenital cataracts	942	10.6	48	9.1	492	12.8	249	8.1	153	10.6
Errors of refraction	433	4.9	4	0.8	214	5.6	158	5.1	57	3.9
Other diseases of retina (not RLF or retinoblastoma)	496	5.6	20	3.8	208	5.4	172	5.6	96	6.6
Congenital defects—not already specified	320	3.6	25	4.7	143	3.7	93	3.0	59	4.1
Cerebral embolism and affection of cortical visual center	252	2.8	30	5.7	107	2.8	64	2.1	51	3.5
Congenital glaucoma	243	2.7	9	1.7	120	3.1	76	2.5	38	2.6
Rubella	122	1.4	25	4.7	71	1.9	16	0.5	10	0.7
Nystagmus	190	2.1	6	1.1	97	2.5	61	2.0	26	1.8
Amblyopia	215	2.4	9	1.7	111	2.9	62	2.0	32	2.2
Unknown, impossible to detect, or no response	1,112	12.5	157	29.7	444	11.6	318	10.4	193	13.3
TOTAL	**7,357**	**82.7**	**397**	**75.1**	**3,131**	**81.6**	**2,641**	**86.0**	**1,187**	**81.8**

*Errors of refraction are not a *cause* of blindness, but a condition. It is listed here because it has been reported to us.

Table 7

Principal Causes of Blindness and Date of Onset of Blindness (N=8,887)

Main Causes of Blindness			*Birth* (N =4,415)		*Before 3 Yrs* (N =2,990)		*After 3 Yrs* (N =581)	
	N	%	N	%	N	%	N	%
Optic atrophy	682	7.7	472	10.7	99	3.3	79	13.6
RLF	2,350	26.4	18	0.4	2,324	77.7	7	1.2
Congenital cataracts	942	10.6	834	18.9	51	1.7	32	5.5
Errors of refraction*	433	4.9	338	7.7	39	1.3	36	6.2
Other diseases of retina (not RLF or retinoblastoma)	496	5.6	341	7.7	56	1.9	81	13.9
Congenital defects—not already specified	320	3.6	310	7.0	7	0.2	1	0.2
Cerebral embolism and affection of cortical visual center	252	2.8	187	4.2	21	0.7	29	5.0
Congenital glaucoma	243	2.7	213	4.8	14	0.5	12	2.1
Rubella	122	1.4	115	2.6	6	0.2		
Nystagmus	190	2.1	179	4.1	6	0.2	4	0.7
Amblyopia	215	2.4	165	3.7	30	1.0	10	1.7
Unknown, impossible to detect, or no response	1,112	12.5	266	6.0	70	2.3	48	8.3
TOTAL	**7,357**	**82.7**	**3,438**	**77.8**	**2,723**	**91.0**	**339**	**58.4**

*Errors of refraction are not a *cause* of blindness, but a condition. It is listed here because it has been reported to us.

Table 8

Additional Impairments in Rank Order of Frequency for MI Blind Sample (N=8,887)

Disability	*Blind Sample*			*Only Additional Impairment*	
	N	%		N	%
Mental retardation	7,131	80.2		2,247	25.3
Speech	3,457	38.9		134	1.5
Brain damage	3,116	35.1		91	1.0
Emotional problems	1,479	16.6		222	2.5
Cerebral palsy	1,279	14.4		102	1.1
Epilepsy	1,248	14.0		68	0.8
Crippling or medical disability	1,055	11.9		197	2.2
Chronic medical	621	7.0			
Crippling	434	4.9			
Hearing impairment	946	10.6		121	1.4
Cosmetic defect	543	6.1		76	0.9
Orthodontic defect	368	4.1		38	0.4
Cleft palate	89	1.0		5	0.1
			TOTAL	**3,301**	**37.2**

Table 9

Hearing As an Additional Impairment and Degree of Vision

Hearing Impairment			Totally Blind (N = 4,309)		Travel Vision (N = 1,233)		Reading Vision (N = 3,213)	
	N	%	N	%	N	%	N	%
Deaf—congenital	250	2.8	151	3.5	44	3.6	53	1.6
Deaf—adventitious	38	0.4	26	0.6	1	0.1	10	0.3
Hard of hearing	658	7.4	288	6.7	108	8.8	255	7.9
Total	*946*	*10.6*	*465*	*10.8*	*153*	*12.5*	*318*	*9.8*
Impossible to determine	84	0.9	76	1.8	4	0.3	4	0.3
No response	7,842	88.2	3,760	87.3	1,074	87.1	2,837	88.2
Aphasia—only	15	0.2	8	0.2	2	0.2	5	0.2
TOTAL	**8,887**	**99.9**	**4,309**	**100.1**	**1,233**	**100.1**	**3,164**	**103.5**
Only additional impairment	121	1.4	50	1.2	16	1.3	53	1.6

Table 10

Hearing As an Additional Impairment and Age (N = 8,887)

Hearing Impairment			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Deaf—congenital	250	2.8	47	8.9	118	3.1	49	1.6	36	2.5
Deaf—adventitious	38	0.4	5	0.9	17	0.4	9	0.3	7	0.5
Hard of hearing	658	7.4	36	6.8	306	8.0	218	7.1	97	6.7
Total	*946*	*10.6*	*88*	*16.6*	*441*	*11.5*	*276*	*9.0*	*140*	*9.7*
Impossible to determine	84	0.9	0	0.0	0	0.0	0	0.0	0	0.0
No response	7,842	88.2	0	0.0	0	0.0	0	0.0	0	0.0
Aphasia—only	15	0.2	2	0.4	7	0.2	4	0.1	2	0.1
TOTAL	**8,887**	**99.9**	**90**	**17.0**	**448**	**11.7**	**280**	**9.1**	**142**	**9.8**
Only additional impairment	121	1.4	7	1.3	53	1.4	36	1.2	24	1.7

Table 11

Hearing As an Additional Impairment and Age at Onset of Blindness (N = 8,887)

Hearing Impairment			*Birth* (N=4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N=581)	
	N	%	N	%	N	%	N	%
Deaf—congenital	250	2.8	156	3.5	46	1.5	11	1.9
Deaf—adventitious	38	0.4	14	0.3	16	0.5	5	0.9
Hard of hearing	658	7.4	361	8.2	212	7.1	34	5.9
Total	*946*	*10.6*	*531*	*12.0*	*274*	*9.1*	*50*	*8.7*
Impossible to determine	84	0.9	0	0.0	0	0.0	0	0.0
No response	7,842	88.2						
Aphasia—only	15	0.2	8	0.2	6	0.2	0	0.0
TOTAL	**8,887**	**99.9**	**539**	**12.2**	**280**	**9.3**	**50**	**8.7**
Only additional impairment	121	1.4	60	1.4	53	1.8	3	0.5

Table 12

Cerebral Palsy and Degree of Vision

Cerebral Palsy			*Totally Blind* (N=4,309)		*Travel Vision* (N=1,233)		*Reading Vision* (N=3,213)	
	N	%	N	%	N	%	N	%
Mildly affected	452	5.1	195	4.5	71	5.8	180	5.6
Grossly affected arms and legs	379	4.3	272	6.3	29	2.4	67	2.1
Grossly affected speech, arms and legs	184	2.1	110	2.6	26	2.1	41	1.3
Grossly affected legs	162	1.8	89	2.1	22	1.8	47	1.5
Total	*1,177*	*13.3*	*666*	*15.5*	*148*	*12.1*	*335*	*10.5*
Only additional impairment	102	1.1	43	1.0	10	0.8	48	1.5

Table 13

Cerebral Palsy and Age

Cerebral Palsy			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Mildly affected	452	5.1	16	3.0	213	5.6	159	5.2	64	4.4
Grossly affected arms and legs	379	4.3	47	8.9	159	4.1	102	3.3	71	4.9
Grossly affected speech, arms, and legs	184	2.1	27	5.1	76	2.0	44	1.4	37	2.6
Grossly affected legs	162	1.8	10	1.9	75	2.0	51	1.7	26	1.8
Total	*1,177*	*13.3*	*100*	*18.9*	*523*	*13.7*	*356*	*11.6*	*198*	*13.7*
Only additional impairment	102	1.1	–	0	56	1.5	35	1.1	11.	0.8

Table 14

Cerebral Palsy and Age at Onset of Blindness

Cerebral Palsy			*Birth* (N=4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N=581)	
	N	%	N	%	N	%	N	%
Mildy affected	452	5.1	244	5.5	175	5.9	18	3.1
Grossly affected arms and legs	379	4.3	197	4.5	99	3.3	15	2.6
Grossly affected speech, arms and legs	184	2.1	114	2.6	54	1.8	9	1.5
Grossly affected legs	162	1.8	80	1.8	72	2.4	8	1.4
Total	*1,177*	*13.3*	*635*	*14.4*	*400*	*13.4*	*50*	*8.6*
Only additional impairment	102	1.1	42	1.0	57	1.9	1	0.2

Table 15

Epilepsy As an Additional Physical Impairment and Degree of Vision (N=8,887)

Epilepsy			*Totally Blind* (N=4,309)		*Travel Vision* (N=1,233)		*Reading Vision* (N=3,213)	
	N	%	N	%	N	%	N	%
Under drug control	228	2.6	122	2.8	48	3.9	56	1.7
Past history and under drug control	242	2.7	152	3.5	37	3.0	51	1.6
Has seizures now and under drug control	125	1.4	75	1.7	27	2.2	23	0.7
Past history, has seizures now and under drug control	68	0.8	38	0.9	12	1.0	15	0.5
Past history of Seizures	271	3.0	171	4.0	51	4.1	42	1.3
Total	*934*	*10.5*	*558*	*12.9*	*175*	*14.2*	*187*	*5.8*
Not under drug control—past history of seizures and has seizures now	92	1.0	71	1.6	12	1.0	8	0.2
Has seizures now	222	2.5	172	4.0	21	1.7	26	0.8
Total	*314*	*3.5*	*243*	*5.6*	*33*	*2.7*	*34*	*1.0*
TOTAL	**1,248**	**14.0**	**801**	**18.6**	**208**	**16.9**	**221**	**6.8**
Only additional impairment	68	0.8	38	0.9	8	0.6	19	0.6

Table 16

Epilepsy As an Additional Physical Impairment and Age (N = 8,887)

Epilepsy			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Under drug control	228	2.6	11	2.1	109	2.8	68	2.2	40	2.8
Past History and under drug control	242	2.7	20	3.8	96	2.5	81	2.6	45	3.1
Has seizures now and under drug control	125	1.4	6	1.1	55	1.4	46	1.5	18	1.2
Past history, has seizures now and under drug control	68	0.8	5	0.9	23	0.6	22	0.7	18	1.2
Past history of seizures	271	3.0	31	5.9	114	3.0	83	2.7	43	3.0
Total	*934*	*10.5*	*73*	*13.8*	*397*	*10.3*	*300*	*9.7*	*164*	*11.3*
Not under drug control—past history of seizures and has seizures now	92	1.0	9	1.7	42	1.1	22	0.7	19	1.3
Has seizures now	222	2.5	51	9.6	80	2.1	59	1.9	32	2.2
Total	*314*	*3.5*	*60*	*11.3*	*122*	*3.2*	*81*	*2.6*	*51*	*3.5*
TOTAL	**1,248**	**14.0**	**133**	**25.1**	**519**	**13.5**	**381**	**12.3**	**215**	**14.8**
Only additional impairment	68	0.8	2	0.4	26	0.7	25	0.8	15	1.0

Table 17

Epilepsy As an Additional Physical Impairment and Date at Onset of Blindness (N=8,887)

Epilepsy			*Birth* (N =4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N=581)	
	N	%	N	%	N	%	N	%
Under drug control	228	2.6	121	2.7	80	2.7	22	3.8
Past history and under drug control	242	2.7	112	2.5	105	3.5	17	2.9
Has seizures now and under drug control	125	1.4	50	1.1	54	1.8	17	2.9
Past history, has seizures now and under drug control	68	0.8	39	0.9	23	0.8	3	0.5
Past history of seizures	271	3.0	145	3.3	86	2.9	14	2.4
Total	*934*	*10.5*	*467*	*10.5*	*348*	*11.7*	*73*	*12.5*
Not under drug control—past history of seizures and has seizures now	92	1.0	56	1.3	19	0.6	14	2.4
Has seizures now	222	2.5	87	2.0	53	1.8	13	2.2
Total	*314*	*3.5*	*143*	*3.3*	*72*	*2.4*	*27*	*4.6*
TOTAL	**1,248**	**14.0**	**610**	**13.8**	**420**	**14.1**	**100**	**17.1**
Only additional impairment	68	0.8	23	0.5	38	1.3	4	0.7

Table 18

Brain Damage As an Additional Physical Impairment and Degree of Vision (N=8,887)

Brain Damage			*Totally Blind* (N=4,309)		*Travel Vision* (N=1,233)		*Reading Vision* (N=3,213)	
	N	%	N	%	N	%	N	%
Definite from medical records	2,987	33.6	1,868	43.4	418	33.9	633	19.7
Suspected from observation	129	1.5	60	1.4	25	2.0	43	1.3
TOTAL	**3,116**	**35.1**	**1,928**	**44.8**	**443**	**35.9**	**676**	**21.0**
Only additional impairment	91	1.0	39	0.9	12	1.0	38	1.2

Table 19

Brain Damage As an Additional Physical Impairment and Age (N = 8,887)

Brain Damage			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Definite from medical records	2,987	33.6	346	65.4	1,302	34.0	860	28.0	479	33.0
Suspected from observation	129	1.5	22	4.2	69	1.8	29	0.9	9	0.6
TOTAL	**3,116**	**35.1**	**368**	**69.6**	**1,371**	**35.8**	**889**	**28.9**	**488**	**33.6**
Only additional impairment	91	1.0	10	1.9	34	0.9	37	1.2	10	0.7

Table 20

Brain Damage As an Additional Physical Impairment and Date at Onset of Blindness (N=8,887)

Brain Damage			*Birth* (N = 4,415)		*Before 3 Yrs* (N = 2,990)		*After 3 Yrs* (N = 581)	
	N	%	N	%	N	%	N	%
Definite from medical records	2,987	33.6	1,337	30.3	860	28.8	212	36.5
Suspected from observation	129	1.5	68	1.5	48	1.6	10	1.7
TOTAL	**3,116**	**35.1**	**1,405**	**31.8**	**908**	**30.4**	**222**	**38.2**
Only additional impairment	91	1.0	45	1.0	28	0.9	17	2.9

Table 21

Miscellaneous Additional Physical Impairments and Conditions and Degree of Vision (N = 8,887)

Physical Impairments and Conditions			*Totally Blind* (N = 4,309)		*Travel Vision* (N = 1,233)		*Reading Vision* (N = 3,213)	
	N	%	N	%	N	%	N	%
Cleft palate	89	1.0	35	0.8	16	1.3	38	1.2
Only additional impairment	5	0.1	1	0.0	1	0.1	3	0.1
Chronic medical problems								
Asthma	39	0.4	14	0.3	6	0.5	19	2.5
Cardiac	163	1.8	43	1.0	50	4.1	66	2.1
Cardiac plus	25	0.3	9	0.2	5	0.4	10	0.3
Total cardiac	*188*	*2.1*	52	*1.2*	55	*4.5*	*76*	*2.4*
TOTAL	**316**	**3.5**	**91**	**2.3**	**77**	**6.3**	**133**	**6.1**
Special congenital anomalies								
Hydrocephalus	169	1.9	119	2.8	25	2.0	21	0.7
Microhydrocephalus	122	1.4	94	2.2	16	1.3	8	0.2
Total	*291*	*3.3*	*213*	*5.0*	*41*	*3.3*	*29*	*0.9*
Mongoloidism	48	0.5	17	0.4	16	1.3	10	0.3
Dwarfism	13	0.1	4	0.1	4	0.3	5	0.2
TOTAL	**352**	**3.9**	**234**	**5.5**	**61**	**4.9**	**44**	**1.4**
Orthodontic defect	368	4.1	180	4.2	54	4.4	134	4.2
Only additional impairment	38	0.4	19	0.4	5	0.4	14	0.4
Cosmetic defect	543	6.1	273	6.3	91	7.4	176	5.5
Only additional impairment	76	0.9	36	0.8	10	0.8	30	0.9

Table 22

Miscellaneous Additional Physical Impairments and Conditions and Age (N = 8,887)

Physical Impairments and Conditions			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Cleft palate	89	1.0	10	1.9	41	1.1	20	0.7	18	1.2
Only additional impairment	5	0.1	0	0.0	2	0.1	2	0.1	1	0.1
Chronic medical problems										
Asthma	39	0.4	1	0.2	15	0.4	16	0.5	7	0.5
Cardiac	163	1.8	22	4.2	84	2.2	37	1.2	20	1.4
Cardiac plus	25	0.3	2	0.4	14	0.4	6	0.2	3	0.2
Total cardiac	*188*	*2.1*	*24*	*4.6*	*98*	*2.6*	*43*	*1.4*	*23*	*1.6*
TOTAL	**316**	**3.5**	**35**	**6.7**	**154**	**4.1**	**79**	**2.6**	**48**	**3.3**
Special congenital anomalies										
Hydrocephalus	169	1.9	38	7.2	81	2.1	27	0.9	23	1.6
Microhydrocephalus	122	1.4	21	4.0	58	1.5	25	0.8	18	1.2
Total	*291*	*3.3*	*59*	*11.2*	*139*	*3.6*	*52*	*1.7*	*41*	*2.8*
Mongoloidism	48	0.5	3	0.6	19	0.5	10	0.3	16	1.1
Dwarfism	13	0.1	0	0.0	5	0.1	3	0.1	5	0.3
TOTAL	**352**	**3.9**	**62**	**11.8**	**163**	**4.2**	**65**	**2.1**	**62**	**4.2**
Orthodontic defect	368	4.1	9	1.7	163	4.3	130	4.2	66	4.6
Only additional impairment	38	0.4			17	0.4	14	0.5	7	0.5
Cosmetic defect	543	6.1	31	5.9	223	5.8	169	5.5	120	8.3
Only additional impairment	76	0.9	6	1.1	31	0.8	26	0.8	13	0.9

Table 23

Miscellaneous Additional Physical Impairments and Conditions and Age at Onset of Blindness (N = 8,887)

Physical Impairments and Conditions			*Birth* (N =4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N =581)	
	N	%	N	%	N	%	N	%
Cleft Palate	89	1.0	74	1.7	8	0.3	7	1.2
Only additional impairment	5	0.1	4	0.1	0	0.0	1	0.2
Chronic Medical Problems								
Asthma	39	0.4	18	0.4	14	0.5	4	0.7
Cardiac	163	1.8	128	2.9	21	0.7	8	1.4
Cardiac plus	25	0.3	21	0.5	2	0.1	2	0.3
Total cardiac	*188*	*2.1*	*149*	*3.4*	*23*	*0.8*	*10*	*1.7*
TOTAL	**316**	**3.5**	**241**	**5.5**	**45**	**1.6**	**21**	**3.6**
Special congenital anomalies								
Hydrocephalus	169	1.9	97	2.2	52	1.7	13	2.2
Microhydrocephalus	122	1.4	94	2.1	15	0.5	7	1.2
Total	*291*	*3.3*	*191*	*4.3*	67	2.2	*20*	*3.4*
Mongoloidism	48	0.5	34	0.8	2	0.1	8	1.4
Dwarfism	13	0.1	5	0.1	3	0.1	4	0.7
TOTAL	**352**	**3.9**	**230**	**5.2**	**72**	**2.4**	**32**	**5.5**
Orthodontic defect	368	4.1	205	4.6	145	4.8	13	2.2
Only additional impairment	38	0.4	18	0.4	20	0.7	0	0.0
Cosmetic defect	543	6.1	337	7.6	154	5.2	35	6.0
Only additional impairment	76	0.9	45	1.0	24	0.8	5	0.9

Table 24

Summary of Miscellaneous Other Physical Impairments and Conditions of MI Blind Sample

Type	N	*Percent of Sample*
Total chronic medical conditions	621	7.0
Total special congenital anomalies	352	4.0
TOTAL	**973**	**11.0**

Table 25
Speech Problems As an Additional Disfunction and Degree of Vision (N = 8,887)

Speech Impairment			*Totally Blind* (N=4,309)		*Travel Vision* (N = 1,233)		*Reading Vision* (N = 3,213)	
	N	%	N	%	N	%	N	%
Noncommunicable	1,758	19.8	1,294	30.0	228	18.5	200	6.2
Echolalia	249	2.8	187	4.3	32	2.6	28	0.9
Total	*2,007*	*22.6*	*1,481*	*34.3*	*260*	*21.1*	*228*	*7.1*
Defective	1,439	16.2	574	13.3	252	20.4	590	18.4
Aphasia—only	11	0.1	5	0.1	4	0.3	2	0.1
TOTAL	**3,457**	**38.9**	**2,060**	**47.7**	**516**	**41.8**	**820**	**25.6**
Only additional impairment	134	1.5	45	1.0	15	1.2	73	2.3

Table 26

Speech Problems As an Additional Disfunction and Age (N = 8,887)

Speech Impairment			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Noncommunicable	1,758	19.8	317	59.9	798	20.8	395	12.9	248	17.1
Echolalia	249	2.8	24	4.5	121	3.2	83	2.7	21	1.4
Total	*2,007*	*22.6*	*341*	*64.4*	*919*	*24.0*	*478*	*15.6*	*269*	*18.5*
Defective	1,439	16.2	63	11.9	684	17.8	482	15.7	209	14.4
Aphasia—only	11	0.1	0	0.0	7	0.2	2	0.1	2	0.1
TOTAL	**3,457**	**38.9**	**404**	**76.3**	**1,610**	**42.0**	**962**	**31.4**	**480**	**33.0**
Only additional impairment	134	1.5	9	1.7	77	2.0	35	1.1	13	0.9

Table 27

Speech Problems As an Additional Disfunction and Age at Onset of Blindness (N = 8,887)

Speech Impairment			*Birth* (N = 4,415)		*Before 3 Yrs* (N = 2,990)		*After 3 Yrs* (N = 581)	
	N	%	N	%	N	%	N	%
Noncommunicable	1,758	19.8	775	17.6	445	14.9	57	9.8
Echolalia	249	2.8	101	2.3	129	4.3	5	0.9
Total	*2,007*	*22.6*	*876*	*19.9*	*574*	*19.2*	*62*	*10.7*
Defective	1,439	16.2	804	18.2	409	13.7	115	19.8
Aphasia—only	11	0.1	5	0.1	4	0.1	1	0.2
TOTAL	**3,457**	**38.9**	**1,685**	**38.2**	**987**	**33.0**	**178**	**30.7**
Only additional impairment	134	1.5	86	1.9	42	1.4	4	0.7

Table 28

Emotional Disorders As an Additional Disfunction and Degree of Vision (N=8,887)

Emotional Problems			*Totally Blind* (N=4,309)		*Travel Vision* (N =1,233)		*Reading Vision* (N=3,213)	
	N	%	N	%	N	%	N	%
Autistic	199	2.2	129	3.0	37	3.0	29	0.9
Psychotic	166	1.9	108	2.5	23	1.9	30	0.9
Neurotic	682	7.7	357	8.3	96	7.8	222	6.9
Emotional disturbances based on observation	432	4.9	236	5.5	64	5.2	130	4.0
TOTAL	**1,479**	**16.7**	**830**	**19.3**	**220**	**17.9**	**411**	**12.7**
Only additional impairment	222	2.5	107	2.5	30	2.4	85	2.6

Table 29

Emotional Disorders As an Additional Disfunction and Age (N = 8,887)

Emotional Problems			*Below 6* (N =529)		*6-12* (N =3,834)		*13-16* (N =3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Autistic	199	2.2	19	3.6	110	2.9	55	1.8	15	1.0
Psychotic	166	1.9	4	0.8	56	1.5	69	2.2	37	2.6
Neurotic	682	7.7	6	1.1	225	5.9	301	9.8	149	10.3
Emotional disturbances based on observation	432	4.9	8	1.5	207	5.4	155	5.0	62	4.3
TOTAL	**1,479**	**16.7**	**37**	**7.0**	**598**	**15.7**	**580**	**18.8**	**263**	**18.2**
Only additional impairment	222	2.5	1	0.2	81	2.1	81	2.6	59	4.1

Table 30

Emotional Disorders As an Additional Disfunction and Age at Onset of Blindness (N = 8,887)

Emotional Problems			*Birth* (N=4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N=581)	
	N	%	N	%	N	%	N	%
Autistic	199	2.2	94	2.1	89	3.0	14	2.4
Psychotic	166	1.9	65	1.5	81	2.7	13	2.2
Neurotic	682	7.7	276	6.3	348	11.6	47	8.1
Emotional disturbances based on observation	432	4.9	183	4.1	194	6.5	30	5.2
TOTAL	**1,479**	**16.7**	**618**	**14.0**	**712**	**23.8**	**104**	**17.9**
Only additional impairment	222	2.5	92	2.1	108	3.6	12	2.1

Table 31

Mental Retardation As an Additional Disfunction and Degree of Vision (N = 8,887)

Mentally Retarded—Slow Learner			*Totally Blind* (N = 4,309)		*Travel Vision* (N = 1,233)		*Reading Vision* (N = 3,213)	
	N	%	N	%	N	%	N	%
Below 25								
IQ	1,292	14.5	1,071	24.9	159	12.9	39	1.2
SQ	152	1.7	55	1.3	9	0.7	88	2.7
Cannot be tested	103	1.2	74	1.7	19	1.5	5	0.2
Total	*1,547*	*17.4*	*1,200*	*27.9*	*187*	*15.1*	*132*	*4.1*
25-49								
IQ	1,030	11.6	616	14.3	175	14.2	213	6.6
SQ	59	0.7	31	0.7	10	0.8	15	0.5
Severely retarded—no test score	163	1.8	124	2.9	23	1.9	11	0.3
Total	*1,252*	*14.1*	*771*	*17.9*	*208*	*16.9*	*239*	*7.4*
TOTAL: 0-49 IQ	**2,799**	**31.5**	**1,971**	**45.8**	**395**	**32.0**	**371**	**11.5**
50-75								
IQ	2,011	22.6	787	18.3	287	23.3	925	28.8
SQ	24	0.3	13	0.3	4	0.3	7	0.2
Mentally retarded—no test score	280	3.2	175	4.1	47	3.8	42	1.3
Total	*2,315*	*26.1*	*975*	*22.7*	*338*	*27.4*	*974*	*30.3*
TOTAL: 0-75 IQ	**5,114**	**57.6**	**2,946**	**68.5**	**733**	**59.4**	**1,345**	**41.8**
Impossible to determine	27	0.3	10	0.2	6	0.5	9	0.3
No response	1,694	19.1	692	16.1	245	19.9	729	22.7
Total	*1,721*	*19.4*	*702*	*16.3*	*251*	*20.4*	*738*	*23.0*
Slow learner (76-90)								
IQ	1,966	22.1	637	14.8	233	18.9	1,086	33.8
SQ	3	0.0	1	0.0	1	0.1	1	0.0
No test score	48	0.5	13	0.3	11	0.9	23	0.7
Total	*2,017*	*22.6*	*651*	*15.1*	*245*	*19.9*	*1,110*	*34.5*
TOTAL: 0-90 IQ	**7,131**	**80.2**	**3,597**	**83.6**	**978**	**79.3**	**2,455**	**76.3**
Mentally retarded only	2,247	25.3	771	17.9	282	22.9	1,176	36.6

Table 32

Mental Retardation As an Additional Disfunction and Age (N = 8,887)

Mentally Retarded—Slow Learner			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Below 25										
IQ	1,292	14.5	184	34.8	508	13.2	358	11.7	242	16.7
SQ	152	1.7	29	5.5	77	2.0	27	0.9	19	1.3
Cannot be tested	103	1.2	42	7.9	31	0.8	21	0.7	9	0.6
Total	*1,547*	*17.4*	*255*	*48.2*	*616*	*16.0*	*406*	*13.3*	*270*	*18.6*
25-49										
IQ	1,030	11.6	54	10.2	482	12.6	343	11.2	151	10.4
SQ	59	0.7	9	1.7	31	0.8	15	0.5	4	0.3
Severely retarded—no test score	163	1.8	27	5.1	67	1.7	39	1.3	30	2.1
Total	*1,252*	*14.1*	*90*	*17.0*	*580*	*15.1*	*397*	*13.0*	*185*	*12.8*
TOTAL: 0-49 IQ	**2,799**	**31.5**	**345**	**65.2**	**1,196**	**31.1**	**803**	**26.3**	**455**	**31.4**
50-75										
IQ	2,011	22.6	27	5.1	857	22.4	851	27.7	275	19.0
SQ	24	0.3	3	0.6	16	0.4	2	0.1	3	0.2
Mentally retarded—no test score	280	3.2	33	6.2	104	2.7	78	2.5	65	4.5
Total	*2,315*	*26.1*	*63*	*11.9*	*977*	*25.5*	*931*	*30.3*	*343*	*23.7*
TOTAL: 0-75 IQ	**5,114**	**57.6**	**408**	**77.1**	**2,173**	**56.6**	**1,734**	**56.6**	**798**	**55.1**
Impossible to determine	27	0.3								
No response	1,694	19.1								
Total	*1,721*	*19.4*								
Slow learner (76-90)										
IQ	1,966	22.1	7	1.3	854	22.3	789	25.7	325	22.4
SQ	3	0.0	1	0.2	2	0.1	0	0.0	0	0.0
No test score	48	0.5	4	0.8	27	0.7	9	0.3	8	0.6
Total	*2,017*	*22.6*	*12*	*2.3*	*883*	*23.1*	*798*	*26.0*	*333*	*23.0*
TOTAL: 0-90 IQ	**7,131**	**80.2**	**420**	**79.4**	**3,056**	**79.7**	**2,532**	**82.6**	**1,131**	**78.1**
Mentally retarded only	2,247	25.3	17	3.2	930	24.3	940	30.6	360	24.8

Table 33

Mental Retardation As an Additional Disfunction and Age at Onset of Blindness (N = 8,887)

Mentally Retarded—Slow Learner			*Birth* (N = 4,415)		*Before 3 Yrs* (N = 2,990)		*After 3 Yrs* (N = 581)	
	N	%	N	%	N	%	N	%
Below 25								
IQ	1,292	14.5	581	13.2	342	11.4	55	9.5
SQ	152	1.7	26	0.6	13	0.4	0	0.0
Cannot be tested	103	1.2	49	1.1	26	0.9	0	0.0
Total	*1,547*	*17.4*	*656*	*14.9*	*381*	*12.7*	55	9.5
25-49								
IQ	1,030	11.6	479	10.8	351	11.7	32	5.5
SQ	59	0.7	24	0.5	20	0.7	0	0.0
Severely retarded—no test score	163	1.8	91	2.1	41	1.4	6	1.0
Total	*1,252*	*14.1*	*594*	*13.4*	*412*	*13.8*	38	6.5
TOTAL: 0-49 IQ	**2,799**	**31.5**	**1,250**	**28.3**	**793**	**26.5**	**93**	**16.0**
50-75								
IQ	2,011	22.6	1,026	23.2	739	24.7	134	23.1
SQ	24	0.3	14	0.3	8	0.3	1	0.2
Mentally retarded—no test score	280	3.2	164	3.7	94	3.1	7	1.2
Total	*2,315*	*26.1*	*1,204*	*27.2*	*841*	*28.1*	*142*	*24.5*
TOTAL: 0-75 IQ	**5,114**	**57.6**	**2,454**	**55.5**	**1,634**	**54.6**	**235**	**40.5**
Impossible to determine	27	0.3						
No response	1,694	19.1						
Total	*1,721*	*19.4*						
Slow learner (79-90)								
IQ	1,966	22.1	1,038	23.5	709	23.7	170	29.3
SQ	3	0.0	1	0.0	2	0.1	0	0.0
No test score	48	0.5	31	0.7	8	0.3	4	0.7
Total	*2,017*	22.6	*1,070*	*24.2*	*719*	*24.1*	*174*	*30.0*
TOTAL: 0-90 IQ	**7,131**	**80.2**	**3,524**	**79.7**	**2,353**	**78.7**	**409**	**70.5**
Mentally retarded only	2,247	25.3	1,167	26.4	756	25.3	137	23.6

Table 34

Total Number of Physical Impairments and Disfunctions Including Visual Impairments (N = 8,887)

Impairments	*Total Respondents*		*Male* (N = 4,994)		*Female* (N = 3,886)		*Not Indicated* (N = 7)	
	N	%	N	%	N	%	N	%
Visual impairment plus mentally retarded only	2,247	25.3	1,197	24.0	1,047	26.9	3	42.9
Visual impairment plus hearing impairment only	121	1.4	64	1.3	57	1.5	0	0.0
Visual impairment plus cerebral palsy only	102	1.1	47	0.9	55	1.4	0	0.0
Visual impairment plus speech problem only	134	1.5	86	1.7	48	1.2	0	0.0
Visual impairment plus epilepsy only	68	0.8	32	0.6	36	0.9	0	0.0
Visual impairment plus cleft palate only	5	0.1	3	0.1	2	0.1	0	0.0
Visual impairment plus brain damage only	91	1.0	56	1.1	34	0.9	1	14.3
Visual impairment plus orthodontic defect only	38	0.4	17	0.3	21	0.5	0	0.0
Visual impairment plus cosmetic defect only	76	0.9	41	0.8	35	0.9	0	0.0
Visual impairment plus emotional problems only	222	2.5	138	2.8	84	2.2	0	0.0
Visual impairment plus one other impairment/disfunction only	197	2.2	98	2.0	99	2.5	0	0.0
Visual impairment plus two other disfunctions	1,999	22.5	1,172	23.5	827	21.3	0	0.0
Visual impairment plus three or more disfunctions	3,587	40.4	2,043	40.9	1,541	39.7	3	42.9
None of the above	2,882	32.4	1,543	30.9	1,335	34.4	4	57.1

Table 35

Visual Impairment plus Other Handicaps and Degree of Vision

Visual Impairment plus Other Handicaps			*Totally Blind*		*Travel Vision*		*Reading Vision*	
	N	%	N	%	N	%	N	%
Visual impairment plus								
two other handicaps	1,999	22.5	907	21.0	272	22.1	788	24.5
three other handicaps	3,587	40.4	2,198	51.0	534	43.3	787	24.5
Total	*5,586*	*62.9*	*3,105*	*72.0*	*806*	*65.4*	*1,575*	*49.0*
One handicap only	3,301	37.1	1,204	27.9	427	34.6	1,638	51.0
TOTAL	**8,887**	**100.0**	**4,309**	**99.9**	**1,233**	**100.0**	**3,213**	**100.0**

Table 36

Visual Impairment plus Other Handicaps and Age

Visual Impairment plus Other Handicaps			*Below 6*		*6-12*		*13-16*		*17-21*	
	N	%	N	%	N	%	N	%	N	%
Visual impairment plus										
two other handicaps	1,999	22.5	65	12.3	832	21.7	739	24.1	363	25.0
three other handicaps	3,587	40.4	394	74.5	1,604	41.8	1,044	34.0	544	37.5
Total	*5,586*	*62.9*	*459*	*86.8*	*2,436*	*63.5*	*1,783*	*58.1*	*907*	*62.5*
One handicap only	3,301	37.1	70	13.2	1,398	36.5	1,289	42.0	543	37.4
TOTAL	**8,887**	**100.0**	**529**	**100.0**	**3,834**	**100.0**	**3,072**	**100.1**	**1,450**	**99.9**

Table 37

Visual Impairment plus Other Handicaps and Age at Onset of Blindness

Visual Impairment plus Other Handicaps			*Birth*		*Before 3 Yrs*		*After 3 Yrs*	
	N	%	N	%	N	%	N	%
Visual Impairment plus								
two other handicaps	1,999	22.5	1,022	23.1	761	25.5	134	23.1
three other handicaps	3,587	40.4	1,705	38.6	1,063	35.6	220	37.9
Total	5,586	62.9	*2,727*	*61.7*	*1,824*	*61.1*	*354*	*61.0*
One handicap only	3,301	37.1	1,688	38.4	1,166	39.0	227	39.1
TOTAL	**8,887**	**100.0**	**4,415**	**100.1**	**2,990**	**100.1**	**581**	**100.1**

Table 38

Reading Grade Levels and Degree of Vision (N = 8,887)

Reading Grade Levels			*Totally Blind* (N = 4,309)		*Travel Vision* (N = 1,233)		*Reading Vision* (N = 3,213)	
	N	%	N	%	N	%	N	%
Not capable of reading	2,909	32.7	1,946	45.2	494	40.1	413	12.8
Too young to read	326	3.7	218	5.1	52	4.2	43	1.3
Total	*3,235*	*36.4*	*2,164*	*50.3*	*546*	*44.3*	*456*	*14.1*
Reading readiness	183	2.0	76	1.8	39	3.2	67	2.1
Preprimer	148	1.7	34	0.8	18	1.5	96	3.0
Primer	89	1.0	23	0.5	10	0.8	56	1.7
Total	*420*	*4.7*	*133*	*3.1*	67	5.5	*219*	6.8
1st grade	696	7.8	235	5.5	93	7.5	367	11.4
2nd grade	631	7.1	208	4.8	76	6.2	346	10.8
3rd grade	646	7.3	201	4.7	64	5.2	380	11.8
Total	*1,973*	*22.2*	*644*	*15.0*	*233*	*18.9*	*1,093*	*34.0*
4th grade	618	7.0	211	4.9	76	6.2	330	10.3
5th grade	483	5.4	193	4.5	54	4.4	233	7.2
6th grade	383	4.3	149	3.5	40	3.2	193	6.0
Total	*1,484*	*16.7*	*553*	*12.9*	*170*	*13.8*	*756*	*23.5*
Primary level (unspecified)	56	0.6	17	0.4	11	0.9	27	0.8
Ungraded—special class	98	1.1	38	0.9	11	0.9	46	1.4
TOTAL PRESECONDARY	**7,266**	**81.7**	**3,549**	**82.6**	**1,038**	**84.3**	**2,597**	**80.6**
7th grade	261	2.9	102	2.4	34	2.8	125	3.9
8th grade	182	2.0	80	1.9	21	1.7	81	2.5
Total	*443*	*4.9*	*182*	*4.3*	55	*4.5*	*206*	*6.4*
9th grade	133	1.5	58	1.3	20	1.6	55	1.7
10th grade	101	1.1	40	0.9	13	1.1	48	1.5
11th grade	67	0.8	24	0.6	9	0.7	34	1.1
12th grade	52	0.6	28	0.6	1	0.1	23	0.7
Secondary (unspecified)	36	0.4	11	0.3	6	0.5	19	0.6
TOTAL SECONDARY	**389**	**4.4**	**161**	**3.7**	**49**	**4.0**	**179**	**5.6**
Beyond secondary	7	0.1	3	0.1	1	0.1	35	1.1
Unknown	71	0.8	25	0.6	14	1.1	35	1.1
Impossible to determine	32	0.4	11	0.3	12	1.0	7	0.2
No response	679	7.6	379	8.8	65	5.3	188	5.8
TOTAL OTHER	**789**	**8.9**	**418**	**9.8**	**92**	**7.5**	**265**	**8.2**

Table 39

Reading Grade Levels (N = 8,887)

Reading Grade Levels			*Below 6* (N = 529)		*6-12* (N = 3,834)		*13-16* (N = 3,072)		*17-21* (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
Not capable of reading	2,909	32.7	193	36.5	1,431	37.3	826	26.9	458	31.6
Too young to read	326	3.7	303	57.3	23	0.6	0	0.0	0	0.0
Total	*3,235*	*36.4*	*496*	*93.8*	*1,454*	*37.9*	*826*	*26.9*	*458*	*31.6*
Reading readiness	183	2.0	5	0.9	138	3.6	39	1.3	1	0.1
Preprimer	148	1.7	2	0.4	119	3.1	19	0.6	8	0.6
Primer	89	1.0	0	0.0	66	1.7	23	0.7	0	0.0
Total	*420*	*4.7*	*7*	*1.3*	*323*	*8.4*	*81*	*2.6*	*9*	*0.7*
1st grade	696	7.8	0	0.0	506	13.2	152	4.9	38	2.6
2nd grade	631	7.1	0	0.0	385	10.0	196	6.4	50	3.4
3rd grade	646	7.3	0	0.0	330	8.6	252	8.2	64	4.4
Total	*1,973*	*22.2*	*0*	*0.0*	*1,221*	*31.8*	*600*	*19.5*	*152*	*10.4*
4th grade	618	7.0	0	0.0	260	6.8	286	9.3	72	5.0
5th grade	483	5.4	0	0.0	124	3.2	288	9.4	71	4.9
6th grade	383	4.3	0	0.0	68	1.8	247	8.0	68	4.7
Total	*1,484*	*16.7*	*0*	*0.0*	*1,858*	*48.4*	*1,463*	*47.5*	*371*	*25.6*
Primary level (unspecified)	56	0.6	0	0.0	22	0.6	17	0.6	17	1.2
Ungraded—special class	98	1.1	0	0.0	35	0.9	43	1.4	19	1.3
TOTAL PRESECONDARY	**7,266**	**81.7**	**503**	**95.1**	**3,507**	**91.4**	**2,388**	**77.7**	**866**	**59.8**
7th grade	261	2.9	0	0.0	26	0.7	178	5.8	57	3.9
8th grade	182	2.0	0	0.0	4	0.1	114	3.7	64	4.4
Total	*443*	*4.9*	*0*	*0.0*	*30*	*0.8*	*292*	*9.5*	*121*	*8.3*
9th grade	133	1.5	0	0.0	3	0.1	71	2.3	58	4.0
10th grade	101	1.1	0	0.0	0	0.0	35	1.1	66	4.6
11th grade	67	0.8	0	0.0	1	0.0	16	0.5	50	3.4
12th grade	52	0.6	0	0.0	1	0.0	6	0.2	45	3.1
Secondary (unspecified)	36	0.4	0	0.0	2	0.1	8	0.3	26	1.8
TOTAL SECONDARY	**389**	**4.4**	**0**	**0.0**	**7**	**0.2**	**136**	**4.4**	**245**	**16.9**
Beyond secondary	7	0.1	0	0.0	0	0.0	0	0.0	7	0.5
Unknown	71	0.8	0	0.0	28	0.7	31	1.0	16	1.1
Impossible to determine	32	0.4	0	0.0	10	0.3	13	0.4	9	0.6
No response	679	7.6	25	4.7	254	6.6	213	6.9	187	12.9
TOTAL OTHER	**789**	**8.8**	**25**	**4.7**	**292**	**7.6**	**257**	**8.3**	**219**	**15.1**

Table 40

Reading Grade Levels and Age at Onset of Blindness (N=8.887)

Reading Grade Levels			*Birth* (N=4,415)		*Before 3 Yrs* (N=2,990)		*After 3 Yrs* (N=581)	
	N	%	N	%	N	%	N	%
Not capable of reading	2,909	32.7	1,327	30.1	828	27.7	128	22.0
Too young to read	326	3.7	169	3.8	56	1.9	2	0.3
Total	*3,235*	*36.4*	*1,496*	*33.9*	*884*	*29.6*	*130*	*22.3*
Reading readiness	183	2.0	97	2.2	71	2.4	9	1.5
Preprimer	148	1.7	102	2.3	36	1.2	8	1.4
Primer	89	1.0	61	1.4	17	0.6	7	1.2
Total	*420*	*4.7*	*260*	*5.9*	*124*	*4.2*	*24*	*4.1*
1st grade	696	7.8	370	8.4	231	7.7	80	13.8
2nd grade	631	7.1	335	7.6	232	7.8	50	8.6
3rd grade	646	7.3	338	8.1	227	7.6	42	7.2
Total	*1,973*	*22.2*	*1,043*	*24.1*	*690*	*23.1*	*172*	*29.6*
4th grade	618	7.0	326	7.4	228	7.6	54	9.3
5th grade	483	5.4	210	4.8	232	7.8	32	5.5
6th grade	383	4.3	162	3.7	179	6.0	31	5.3
Total	*1,484*	*16.7*	*698*	*15.9*	*639*	*21.4*	*117*	*20.1*
Primary level (unspecified)	56	0.6	33	0.7	13	0.4	4	0.7
Ungraded or special class	98	1.1	56	1.3	32	1.1	5	0.9
TOTAL PRESECONDARY	**7,266**	**81.7**	**3,586**	**81.8**	**2,382**	**79.8**	**452**	**77.7**
7th grade	261	2.9	120	2.7	118	3.9	20	3.4
8th grade	182	2.0	83	1.9	83	2.8	15	2.6
Total	*443*	*4.9*	*203*	*4.6*	*201*	*6.7*	*35*	*6.0*
9th grade	133	1.5	67	1.5	50	1.7	12	2.1
10th grade	101	1.1	45	1.0	36	1.2	17	2.9
11th grade	67	0.8	36	0.8	23	0.8	8	1.4
12th grade	52	0.6	21	0.5	22	0.7	9	1.5
Secondary (unspecified)	36	0.4	14	0.3	15	0.5	7	1.2
TOTAL SECONDARY	**389**	**4.4**	**183**	**4.1**	**146**	**4.9**	**53**	**9.1**
Beyond secondary	7	0.1	2	0.0	1	0.0	3	0.5
Unknown	71	0.8	39	0.9	21	0.7	9	1.5
Impossible to determine	32	0.4	18	0.4	7	0.2	2	0.3
No response	679	7.6	367	8.3	233	7.8	27	4.6
TOTAL OTHER	**789**	**8.8**	**426**	**9.6**	**262**	**8.7**	**41**	**6.9**

Table 41

Principal Mode of Reading and Degree of Vision (N = 8,887)

Principal Mode of Reading			Totally Blind (N = 4,309)		Travel Vision (N = 1,233)		Reading Vision (N = 3,213)	
	N	%	N	%	N	%	N	%
None	3,349	37.7	2,225	51.6	573	46.5	473	14.7
Braille	2,086	23.5	1,580	36.7	417	33.8	82	2.5
Braille and records or tapes	140	1.6	113	2.6	22	1.8	5	0.1
Braille and large type	62	0.7	0	0.0	23	1.9	39	1.2
Braille and regular type	4	0.0	0	0.0	0	0.0	4	0.1
Total	*2,292*	*25.8*	*1,693*	*39.3*	*462*	*37.5*	*130*	*3.9*
Large type	1,843	20.7	0	0.0	99	8.0	1,743	54.2
Large type and records or tapes	111	1.2	0	0.0	10	0.8	101	3.1
Large type and regular type	118	1.3	0	0.0	3	0.2	113	3.5
Total	*2,072*	*23.2*	*0*	*0.0*	*112*	*9.0*	*1,957*	*60.8*
Regular type	499	5.6	0	0.0	11	0.9	488	15.2
Regular type and records or tapes	38	0.4	0	0.0	1	0.1	37	1.1
Total	*537*	*6.0*	*0*	*0.0*	*12*	*1.0*	*525*	*16.3*
Records	38	0.4	25	0.6	7	0.6	6	0.2
Tapes	9	0.1	1	0.0	3	0.2	5	0.1
Records and tapes	27	0.3	12	0.3	6	0.5	9	0.3
Total	*74*	*0.8*	*38*	*0.9*	*16*	*1.3*	*20*	*0.6*
Impossible to determine	40	0.5	24	0.6	4	0.3	7	0.2
No response	524	5.9	330	7.7	54	4.4	101	3.1
Total	*564*	*6.4*	*354*	*8.3*	*58*	*4.7*	*108*	*3.3*

Table 42

Principal Mode of Reading and Age (N = 8,887)

Principal Mode of Reading			Below 6 (N = 529)		6-12 (N = 3,834)		13-16 (N = 3,072)		17-21 (N = 1,450)	
	N	%	N	%	N	%	N	%	N	%
None	3,349	37.7	498	94.1	1,527	39.8	857	27.9	466	32.1
Braille	2,086	23.5	4	0.8	754	19.7	969	31.5	359	24.8
Braille and records or tapes	140	1.6	0	0.0	38	1.0	74	2.4	28	1.9
Braille and large type	62	0.7	0	0.0	20	0.5	30	1.0	12	0.8
Braille and regular type	4	0.0	0	0.0	1	0.0	3	0.1	0	0.0
Total	*2,292*	25.8	*4*	*0.8*	*813*	*21.2*	*1,076*	*35.0*	*399*	*27.5*
Large type	1,843	20.7	5	0.9	943	24.6	652	21.2	242	16.7
Large type and records or tapes	111	1.2	0	0.0	66	1.7	26	0.8	19	1.3
Large type and regular type	118	1.3	0	0.0	49	1.3	51	1.7	18	1.2
Total	*2,072*	23.2	5	*0.9*	*1,058*	27.6	*729*	23.7	*279*	*19.2*
Regular type	499	5.6	0	0.0	205	5.3	188	6.1	106	7.3
Regular type and records or tapes	38	0.4	0	0.0	8	0.2	16	0.5	14	1.0
Total	*537*	*6.0*	*0*	*0.0*	*213*	5.5	*204*	6.6	*120*	*8.3*
Records	38	0.4	0	0.0	8	0.2	19	0.6	11	0.8
Tapes	9	0.1	0	0.0	0	0.0	6	0.2	3	0.2
Records and tapes	27	0.3	0	0.0	3	0.1	8	0.3	16	1.1
Total	*74*	*0.8*	*0*	*0.0*	*11*	*0.3*	*33*	*1.1*	*30*	*2.1*
Impossible to determine	40	0.5	0	0.0	18	0.5	14	0.5	8	0.6
No response	524	5.9	22	4.1	195	5.1	159	5.2	148	10.2
Total	*564*	*6.4*	*22*	*4.1*	*213*	5.6	*173*	5.7	*156*	*10.8*

N

Table 43

Principal Mode of Reading and Age at Onset of Blindness (N = 8,887)

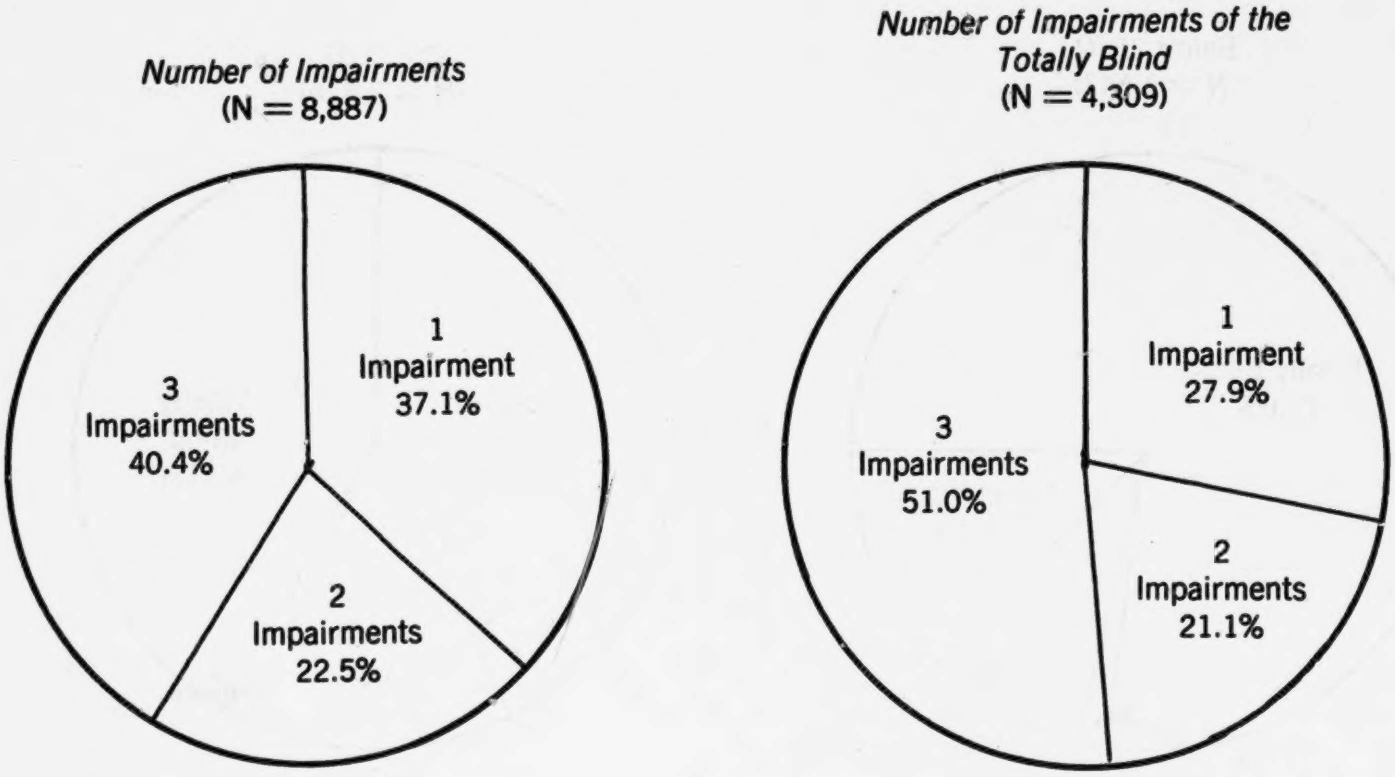
Principal Mode of Reading			*Birth* (N = 4,415)		*Before 3 Yrs* (N = 2,990)		*After 3 Yrs* (N = 581)	
	N	%	N	%	N	%	N	%
None	3,349	37.7	1,561	35.4	927	31.0	133	22.9
Braille	2,086	23.5	643	14.6	1,252	41.9	167	28.7
Braille and records or tapes	140	1.6	31	0.7	94	3.1	13	2.2
Braille and large type	62	0.7	35	0.8	16	0.5	10	1.7
Braille and regular type	4	0.0	3	0.1	1	0.0	0	0.0
Total	*2,292*	*25.8*	*712*	*16.2*	*1,363*	*45.5*	*190*	32.6
Large type	1,843	20.7	1,274	28.9	357	11.9	151	26.0
Large type and records or tapes	111	1.2	89	2.0	12	0.4	6	1.0
Large type and regular type	118	1.3	84	1.9	21	0.7	7	1.2
Total	*2,072*	*23.2*	*1,447*	32.8	*390*	*13.0*	*164*	*28.2*
Regular type	499	5.6	336	7.6	88	2.9	54	9.3
Regular type and records or tapes	38	0.4	25	0.6	4	0.1	5	0.9
Total	*537*	*6.0*	*361*	*8.2*	*92*	*3.0*	59	*10.2*
Records	38	0.4	11	0.2	17	0.6	9	1.5
Tapes	9	0.1	4	0.1	3	0.1	2	0.3
Records and tapes	27	0.3	14	0.3	8	0.3	5	0.9
Total	*74*	*0.8*	*29*	*0.6*	*28*	*1.0*	*16*	*2.7*
Impossible to determine	40	0.5	24	0.5	10	0.3	5	0.9
No response	524	5.9	281	6.4	181	6.1	14	2.4
Total	*564*	*6.4*	*305*	*6.9*	*191*	*6.4*	*19*	*3.3*

Table 44

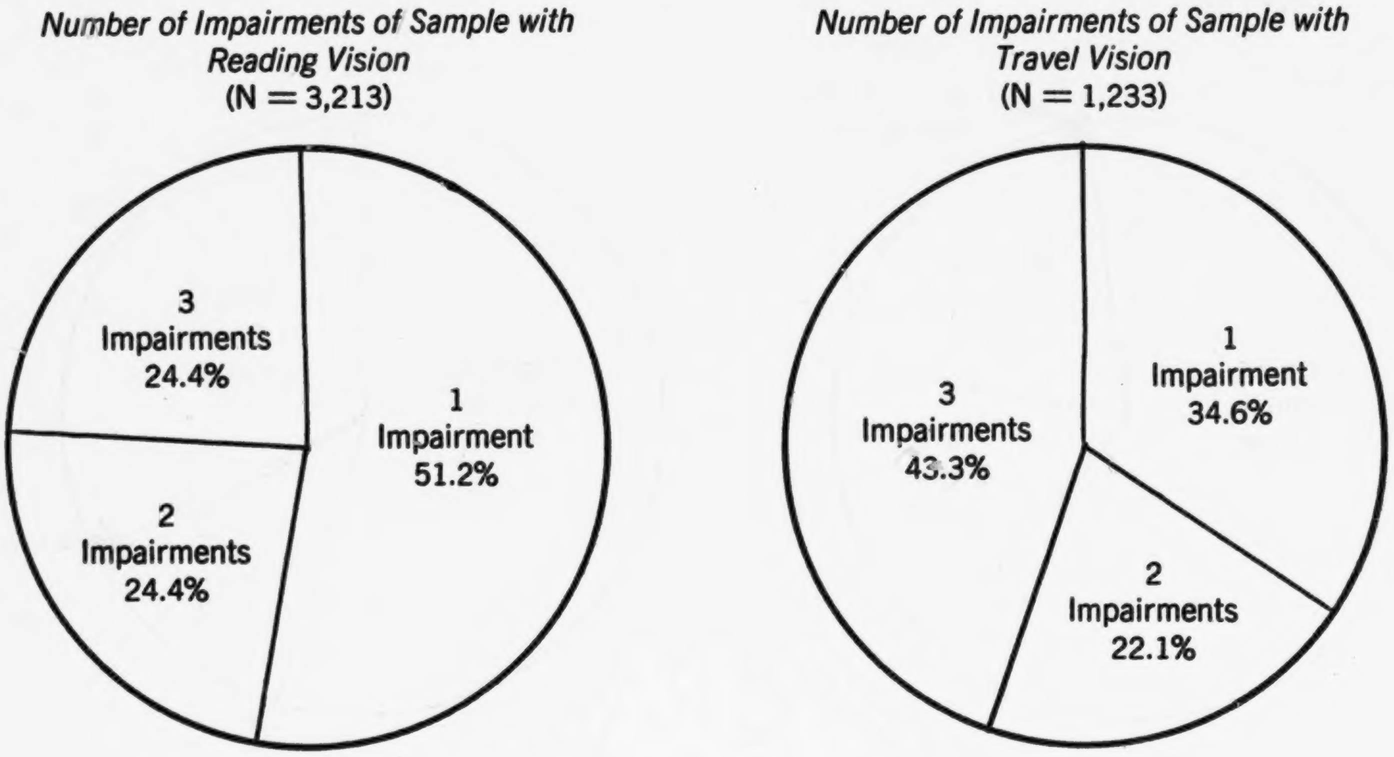
Reported Mobility Performance of MI Blind Sample (N = 8,887)

Mobility Performance	*Total Respondents*		*Male* (N = 4,994)		*Female* (N = 3,886)		*Totally Blind* (N = 4,309)		*Has Travel Vision* (N = 1,233)	
	N	%	N	%	N	%	N	%	N	%
Usually with sighted guide	1,874	21.1	1,024	20.5	848	21.8	1,546	35.9	210	17.0
Usually with cane	101	1.1	49	1.0	52	1.3	73	1.7	21	1.7
Travels independently	4,564	51.4	2,595	52.0	1,965	50.6	1,095	25.4	807	65.5
Travels in a wheelchair	111	1.2	61	1.2	50	1.3	55	1.3	9	0.7
Uses crutches or braces to travel	55	0.6	29	0.6	26	0.7	17	0.4	9	0.7
Too young to determine mode	53	0.6	30	0.6	23	0.6	38	0.9	8	0.6
Nonambulatory—no mobility, bedridden	763	8.6	421	8.4	342	8.8	675	15.7	50	4.1
Impossible to determine from data given	67	0.8	39	0.8	28	0.7	47	1.1	13	1.1
No response	1,299	14.6	746	14.9	552	14.2	763	17.7	106	8.6

Appendix 2
Illustrations


Number of Impairments
(N = 8,887)

Number of Impairments of the Totally Blind
(N = 4,309)


Number of Impairments of Sample with Reading Vision
(N = 3,213)

Number of Impairments of Sample with Travel Vision
(N = 1,233)

Figure 1

Number of Impairments in Addition to Visual Impairment of the MI Blind Sample (N = 8,887)

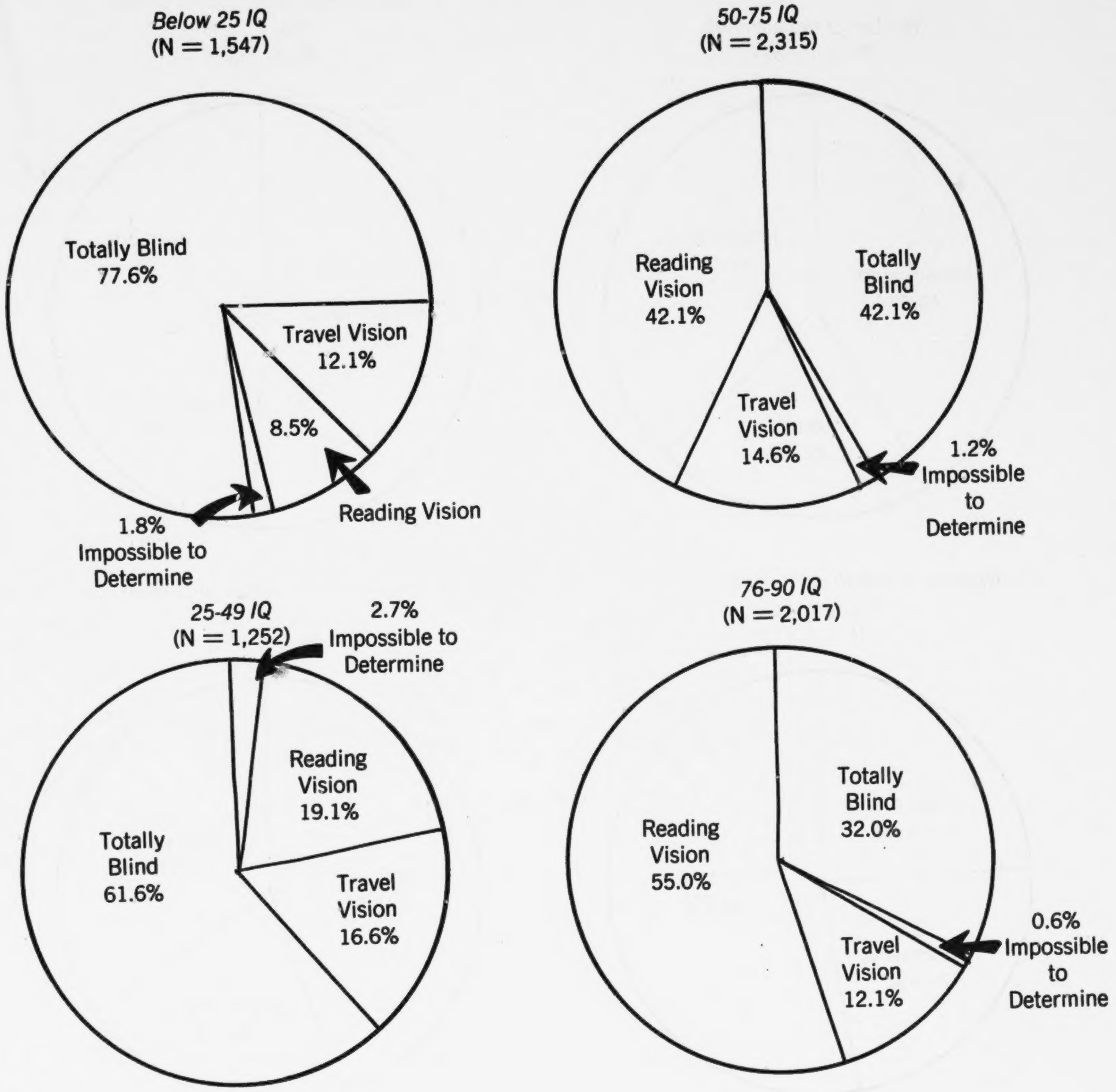


Figure 2

Degree of Vision of the Mentally Retarded in the MI Blind Sample (N = 7,131)

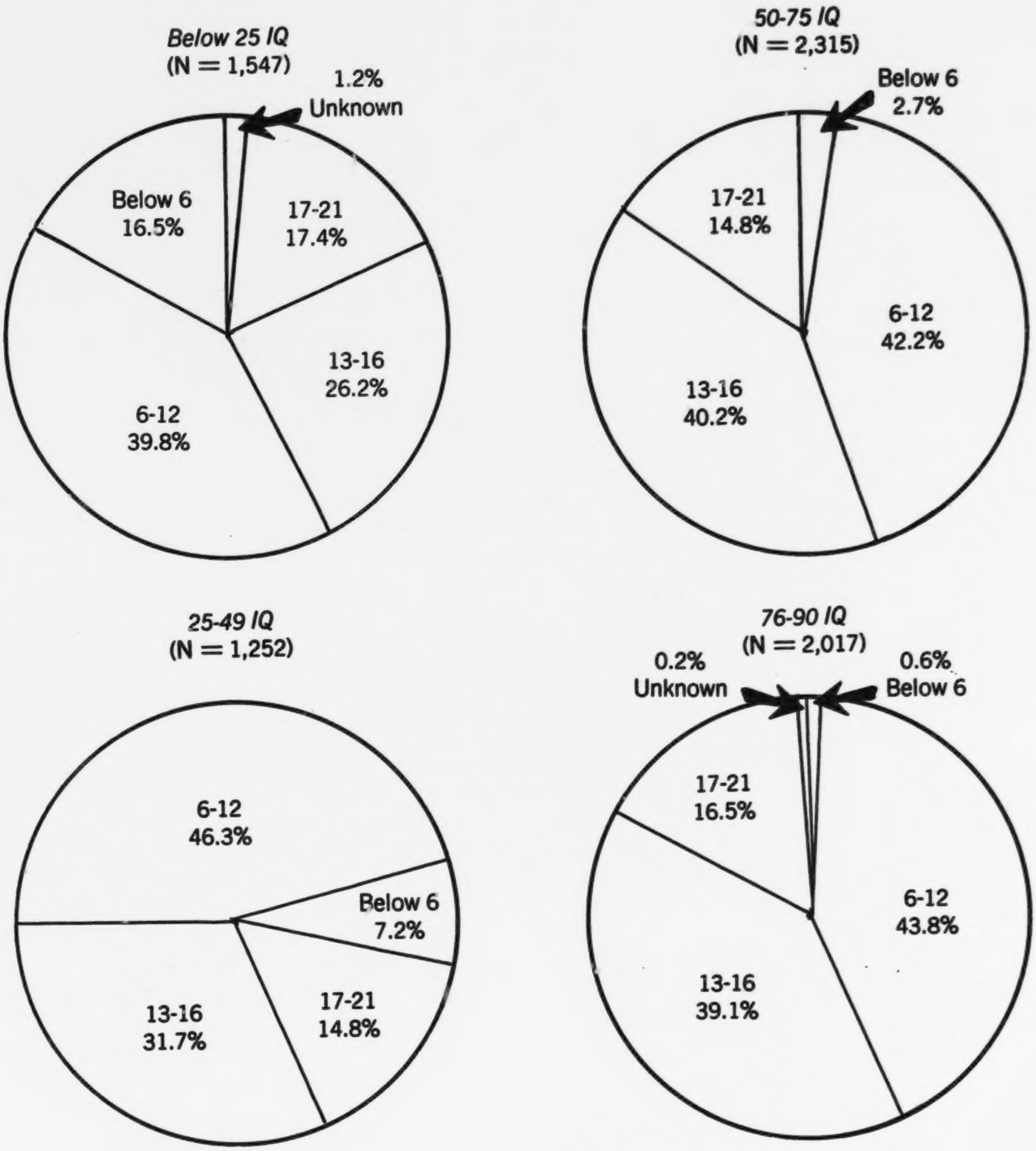


Figure 3

Present Age of the Mentally Retarded in the MI Blind Sample (N = 7,131)

Appendix 3

Multiply-Impaired Blind Children: An Experimental Severity Rating Scale

Recently, the Research Department of the American Foundation for the Blind collected data on 8,887 multiply-impaired blind children throughout the United States. Besides documenting the already obvious fact that multiply-impaired children are a national problem about which little is being done nationally, we had to ask ourselves how the data might be used to help agencies and institutions in the field concerned with this growing group of children. By chance two documents came to our attention that confirmed our suspicion that a new approach to handling such data was needed.

The first was a doctoral dissertation which with some changes was recently published as American Foundation for the Blind Research Series No. 16: *The Blind Child with Concomitant Disabilities* by James M. Wolf, Ed.D. (University of Pittsburgh), 1967. Dr. Wolf reviews the various incidence and prevalence studies but can find nothing more useful in them than the accepted facts that the number of multiply-impaired children is increasing as births of premature babies increase, facts that nobody disputes. But how *useful* is it to have the obvious documented?

Wolf also thinks that much confusion has arisen from studies and statistical compilations that bog down in what may be called the battle of the classifiers (my phrase, not Wolf's). A great deal of valuable data has been wasted in the discussion over which of several disabilities is primary and which secondary, which should be treated medically first and which should be considered first in the education of the child, and so on. These are futile exercises, it seems to me, because it is the whole configuration of the child's needs (physical, mental, and emotional) that should concern us. What does it matter whether his cerebral palsy is more severe than his visual loss? The question is "What can we do for him?" "What resources do we need to help him?"

This last question is important and basic to the discussion. Wolf quotes Goodenough as saying "...even with the best of training only a few of the children who suffer from more than one major defect can become capable of complete self-support in a world of normal people." How widespread this view may be is hard to tell, but if it is too prevalent we will need many more institutions for custodial care "jungles." The underlying assumption to this whole discussion is: *given the proper diagnoses, training, and care, multiply-impaired children can be helped to achieve more effective living.* This has been done in individual cases and with at least one group in a systematic way.

It is the group experience that has some valuable lessons for us because it offers a simple and effective method. A research project at the Oregon State School for the Blind under the supervision of Mr. Charles C. Woodcock has as its "over-all objective... to design a therapeutic school program for the multi-handicapped blind child. The purposes of the program will be:

(a) to identify those children who can profit from such a program from among the large group of multi-handicapped blind children;
(b) to develop medical, psychiatric, psychological, and educational evaluation procedures which will help make it possible to identify good prospects for special programs;
(c) to maintain these children in the special program only so long as they require its protective benefits, and to move them into regular classes as soon as possible; and
(d) insofar as possible, to avoid the institutional transfer of the multi-handicapped blind child to the mental hospital or to a home for the retarded."

Besides a most effective proof of his thesis that such children can be educated — and a striking 6 mm color film is one part of that proof — Dr. Woodcock has offered us an alternative instrument hat is worth discussion and experimental use. Faced with the problem of estimating the resources he needed to accomplish his goals with the twelve multiply-impaired children who were the experimental group, he needed to know something about the *severity* of the children's problems. Taking the questionnaire from the AFB survey of multiply-impaired children — which had previously been adapted from Wolf's questionnaire for his dissertation—Dr. Woodcock devised a rating scale that gave a numerical rating for each child and a group rating as desired.

The rating scale was devised in this way. Starting with the premise that one average teacher can handle ten "normal" blind children, it can be stated quantitatively that blindness alone has a numerical value of six and therefore that one average teacher can handle a teaching load of sixty points. Then, placing weighted numerical scores on all other impairments and disabilities in terms of severity, the following table can be followed to compute an individual child's score:

Oregon Severity Rating Scale for Multiply-Impaired Children
(Experimental)

A through E is based on the difference between their chronological age as of April 15, 1966 and their level of achievement academically by results of the Standard Achievement Test.

A Student one year or more ahead of chronological level on Stanford Achievement Test—minus 2
B At chronological grade level on SAT—0
C One year below chronological grade level on SAT—2
D Two years below chronological grade level on SAT—4
E Three or more years below chronological grade level on SAT—6

F Congenitally totally blind or blind very near birth or has extremely distorted vision—2

G through I are below average IQ scores based solely on classroom observation of their functioning level. Their potential may be higher.

G Observed functioning IQ of 75-90—4
H Observed functioning IQ of 50-75—6
I Observed functioning IQ below 50—8

J Hard of hearing (mild)—2
K Hard of hearing (moderate)—4
L Hard of hearing (severe)—6

M through P are emotional disabilities. Definitions are based on the effect of the disability in the classroom. It is not a medical definition.

M Emotional problem Neurotic—4. Neurosis, a minor mental disorder which may manifest itself as a bodily disturbance without structural abnormality. Emotional reaction may be intensified or dulled, but not sufficiently to change the individual basically.

N Emotional problem Hyperactive—8. Hyperactivity, an episode of transient disorganization in which the external factors are apt to be lost sight of because of the conspicuousness of the internal factors. The child gives the impression of a human engine which has lost its governor. He talks too much, goes too fast, sleeps too little, displays incessant, essentially aggressive behavior, and impaired judgment.

O Emotional problem Autistic—8. Autism, a condition of mental introversion in which the attention or interest is fastened upon the child's own ego. A self-centered mental state from which reality tends to be excluded. The child daydreams, withdraws, and finds satisfaction in phantasy of wish fulfillment. There is little or no interaction with others.

P Emotional problem Psychotic—8. Psychosis, a mental disorder of such magnitude that there is personality disintegration and loss of contact with reality, usually without clearly defined physical cause or structural defect of the brain. The child may have hallucinations and manifest marked indifference and distorted behavior.

Q Usually requires a guide for mobility—4. Immobile—8
R Speech handicap (mild)—2
S Speech handicap (moderate to extreme)—4
T Cerebral palsy (mild)—2
U Cerebral palsy (moderate)—4
V Cerebral palsy (severe)—6
W Brain damage (mild)—2
X Brain damage (moderate)—4
Y Brain damage (severe)—6
Z Epileptic, not adequately controlled by medication—2 to 8

Before discussing the implications of the Severity Rating Scale, let us take an example for the sake of clarification. One of the students the city schools of Whittier, California, reported on the AFB survey of multi-impaired children was Michael G., male, aged 13, born November 26, 1952, visually impaired (ADD 6) from retinal scars, from birth (ADD 2), no data on CA on SAT but reading grade level is 2 for 13-year-old (ADD 6), with an IQ in the 50-75 range (ADD 6), no hearing impairments reported, no emotional problems reported, mild speech handicap (ADD 2), no cerebral palsy reported, past history of epilepsy (ADD 2), no other conditions reported, travels independently. Total score for Michael G.: 24. In terms of teacher load, one average teacher could be expected to handle 2.5 Michaels, or an experienced and above-average teacher could handle three Michaels without undue stress.

There are obvious limitations to a scale such as this, the greatest of which is difference of interpretation by raters. For example, the terms mild, moderate, and severe might be more specific. Immobility might be defined more specifically. And so on. Hoping to cut differences of interpretation to a minimum, I suggest experimental use of the following modified severity scale.

Experimental Severity Rating Scale for Multiply-Impaired Children

(Modified Woodcock Scale, 1967)

Tests

1. Functional Vision Test

Blindness

(1) Totally blind (a) from birth or (b) before 3 years old — ADD 10
(2) Light perception *(not projection)* (a) from birth or (b) before 3 years of age — ADD 10

Severe Visual Impairment

(1) Answers "Yes" to "Can you see where the light comes from?" and "No" to all other questions below. Light projection only. — ADD 10
(2) Answers "Yes" to "Can you see moving objects like cars?" and "No" to all other questions below. Counts fingers. Has Snellen 1/200 to 5/200 and
    (a) poor fields (under 200) — ADD 10
    (b) good fields — ADD 8
(3) Answers "Yes" to "Can you make out a friend's face?" and "No" to all other questions below. Snellen 6/200 and 9/200 and
    (a) poor fields — ADD 10
    (b) good fields — ADD 8
(4) Answers "Yes" to "Can you see to step down?" and "No" to all other questions below. Snellen 10/200 and 15/200 and
    (a) poor fields — ADD 8
    (b) good fields — ADD 6
(5) Answers "Yes" to "Can you recognize a friend across the street?" and "No" to all other questions below. Snellen 15/200 to 20/200 and
    (a) poor fields — ADD 6
    (b) good fields — ADD 4
(6) Answers "Yes" to "Can you read ordinary newspaper print (8-10 point) without glasses?" and "No" to all other questions below. Snellen 20/200 to 20/70. Reads large type books with correction to 20/70 or J7 and
    (a) poor fields — ADD 4
    (b) good fields — ADD 2
(7) Answers "Yes" to "Can you read ordinary newspaper print (8-10 point) without glasses?" Snellen 20/50 or J5 or better and
    (a) poor fields — ADD 2
    (b) good fields — ADD 0

II. Functional Hearing Test

Deafness

(1) Deaf from birth or before 3 years ADD 8
(2) Deaf after 3 years old ADD 6

Hard of Hearing (with correction of hearing aid)

(1) Hears only shouts at 3 to 5 feet ADD 4
(2) Hears only raised voice at 3 to 5 feet ADD 2
(3) Hears normal speaking voice at 3 to 5 feet ADD 0

III. Functional Chronological Age vs Academic Level of Achievement Test

(1) Three or more years below chronological grade level on Stanford Achievement Test (SAT) or three or more years below expected reading grade level (with age 6 being first grade, 7, second grade, etc.). ADD 6
(2) Two years below chronological grade level on SAT or two years below expected reading grade level ADD 4
(3) One year below chronological grade level on SAT or one year below expected reading grade level ADD 2
(4) At chronological grade level on SAT or at expected reading grade level ADD 0
(5) One year or more ahead of chronological level on SAT or reading grade level one year or more ahead of age SUBTRACT 2

IV. Functional Intelligence Test

(1) An IQ of 49 or below or observed functioning at a level of one half or less of chronological age, trainable not educable ADD 8
(2) An IQ of 50-74 or observed functioning at a level of one half to three quarters of chronological age, educable ADD 6
(3) An IQ of 75-89 or observed functioning at a level of three quarters to the lower limits of chronological age, educable ADD 4
(4) An IQ of 90-109 or observed functioning at expected level for chronological age ADD 0
(5) An IQ of 110 or higher or observed functioning at higher than expected level for chronological age SUBTRACT 2

V. Functional Emotional Abilities Test

(1) *Psychotic*. Extreme disorder resulting in a loss of contact with reality usually without physical cause or structural defect of the brain. Common symptoms are hallucinations and distorted behavior based on a private imaginary scheme of life. ADD 8
(2) *Autistic*. Extreme withdrawal with little or no personal interaction with others and avoidance of language as a means of communication. ADD 8
(3) *Hyperactive*. Extreme motor activity, destructively aggressive for no apparent cause. Appears to lack judgment or control of personal behavior. ADD 8
(4) *Neurotic*. Moderate to minor disturbance(s) with some marked distorted views of the world such as inordinate fears (phobias) and inordinate desires (manias), which do not interfere seriously with social interaction with others nor result in personality disintegration. ADD 4
(5) *Normal*. Expected social behavior and social interaction of a multiply-impaired child in an institutional or academic setting functioning at about his chronological age level. ADD 0
(6) *Supportive personality*. Through well-balanced behavior and positive personality characteristics contributes to the morale of the group and lessens care and restraint required of staff members. SUBTRACT 4

VI. Speech Problems Test

(1) *Noncommunicative*. Says no more than three words consecutively or together to persons other than nuclear family.	ADD 6
(2) *Echolalic*. Repeats what is said. No original language.	ADD 4
(3) *Speech defects*. Problems of articulation (sound production), of phonation (voice production) or of rhythm (stammering).	ADD 2
(4) No speech problems. Functions at age level.	ADD 0

VII. Cerebral Palsy Test

(1) Grossly affected speech and/or motor activities	ADD 6
(2) Moderately affected speech and/or motor activities	ADD 4
(3) Mildly affected speech and/or motor activities	ADD 2
(4) No history of cerebral palsy	ADD 0

VIII. Brain Damage Test

(1) Severe brain damage indicated on medical or EEG records	ADD 6
(2) Moderate brain damage	ADD 4
(3) Mild brain damage	ADD 2
(4) No history of brain damage	ADD 0

IX. Epilepsy Test

(1) Under constant drug control	ADD 8
(2) Occasional seizures with medication required	ADD 6
(3) Infrequent seizures with no medication	ADD 4
(4) History of seizures but none recently	ADD 2
(5) No history of seizures	ADD 0

X. Mobility Test

(1) Immobile. Must be carried by others	ADD 8
(2) Travels only with sighted guide	ADD 6
(3) Travels independently only in familiar places	ADD 4
(4) Travels independently in both familiar and unfamiliar places with aids like guide dogs or canes	ADD 2
(5) Travels independently in both familiar and unfamiliar places using only own travel vision	ADD 0

Scoring Sheet for Severity Rating Scale for Multiply-Impaired Children (Experimental)

Test *Score*

I. Vision score ________
II. Hearing ________
III. CA vs Academic Achievement ________
IV. IQ ________
V. Emotional ________
VI. Speech ________
VII. Cerebral Palsy ________
VIII. Brain Damage ________
IX. Epilepsy ________
X. Miscellaneous Physical ________
XI. Mobility ________

While this experimental scale leaves much to be desired, it should be useful in determining individual scores. These scores should be arrived at by group consensus of the most experienced personnel in the organization. Teachers should have at least ten years' experience teaching sighted and blind children with three-to-five years' experience in teaching MI blind children. The houseparent or other rating personnel should be equally well qualified if the individual's score is to be meaningful.

So much for individual scores. Can the Severity Rating Scale be used to estimate an overall academic load for an institution? I think it can. Mr. Woodcock has used his scale successfully at the Oregon State School for the Blind. Two other schools for the blind in the East, both long established and with excellent reputations, appear to have arrived pragmatically at similar estimates of their academic loads. In both cases, total school enrollment is about 300 students and the academic faculty numbers one-half of their permanent employees. School A reports on the AFB survey only eighty multiply-impaired students, or 27 percent of its student body. Using the Severity Rating Scale on the AFB survey report, School A needs 24.5 teachers for its multiply-impaired students (Stanford Achievement Test scores were unavailable so half of the group was rated one year behind its chronological age, probably an underestimate) and 20.5 teachers for its "normal" blind students for a total of 45 teachers needed. In the 1965-1966 school year there were 46 full-time teachers for an overall ratio of about one teacher to three students.

School B had many more multiply-impaired students, 44 percent of its total enrollment. Using the Severity Rating Scale, School B needed 43 teachers for its multiply-impaired (SAT scores were unavailable here too, so the same approximation method was used) and 28 teachers for its "normal" blind students for a total of 71 teachers needed. In the 1965-66 school year there were 72 full-time teachers on the faculty for an overall ratio of about one teacher to two students.

Experience has obviously brought School A and School B to similar solutions to their staffing problems: about 50 percent are teachers, 29 percent are houseparents, and 21 percent are supporting staff (administrative, health services, and so on). Their estimates of the teaching load seem realistic, using their reports and the Severity Rating Scale. Whether their ratios of houseparents are as satisfactory is hard to say, but some superintendents feel that this need has been consistently underestimated, especially in view of the increasing number of multiply-impaired children who require much more care. If the thesis is accepted that these children can be helped, their nonacademic care becomes crucial. Over the years concern has been voiced that visually-impaired children who appear retarded are really understimulated. Perhaps more stimulation would cause the rate of retardation reported (80 percent in a national sample) to be lower among the multiply-impaired. In any event, the use of the Severity Rating Scale for estimating nonacademic needs in a residential school might be a useful exercise.

Having said that the Severity Rating Scale appears to be useful in estimating academic load and possibly nonacademic needs, I hasten to add that it has all of the shortcomings of a rating scale as well. At their best all rating scales are rough approximations of what they purport to measure.

They must be well constructed, administered carefully, and interpreted very carefully. Take, for instance, the matter of hearing, the most important second sense to people who have a visual loss. What constitutes a hearing loss for a blind or visually impaired person? Audiologists quibble about exact measure of normal loss for sighted persons in stated age groups, but something like a 30-decibel loss in the speech range is said to be adequate for everyday listening (speech reception) for a sighted adult. What about a blind adult? We maintained in a recent study on blinded veterans that a 15-decibel loss is adequate for speech reception. Even at this level of loss, many auditory cues are missing. Also, how important are the high-range frequencies (8,000-4,000 cps) for mobility? In those rare instances where research has considered this question, the high-frequency range seems important, though seldom, if ever, are blind subjects given such tests.

A recent study causes grave doubts to arise as to whether any auditory measurements are accurate enough in most studies anyway. North Carolina's Calibration Center recently reported that not one of 100 audiometers tested met the study's calibration specifications. Evaluations ranged from "slightly out of calibration" to "inoperable," with the majority being "grossly out of calibration" (1).

These are auditory measurement problems for adults and since hearing losses are age-related, little thought has been given to hearing losses among blind children. What tests should be given? What losses set as mild, moderate, and severe (2)? Should the hearing losses be correlated with the visual losses for an estimate of the effect on communication, perception, and mobility? These are questions that remain to be resolved and that are especially important in a multiply-impaired population. The Severity Rating Scale has none of these subtleties and perhaps doesn't need them, for it asks for an expert observation of how the child performs with regard to his hearing. If the teacher, nurse, and housemother agree that the child appears to have a hearing problem because he *functions* that way, for their purposes he has a hearing problem whatever the clinicians say. Still in the interest of better treatment it would be good to know whether the loss is organic or not.

The Severity Rating Scale has other limitations too. The IQ is an "observed functioning IQ," for example. If the staff psychologist agrees with the teacher and the houseparents that a child appears to fall within a certain IQ range, formal tests might tell no more.

These criticisms of the Severity Rating Scale are made to stress certain points. It is an experimental scale that requires refinement. It requires considerable consensus among the staff dealing with the child about each rating. It needs to be given fairly often to take account of developments, which among the multiply-impaired children can be spectacular. It requires in interpretation that the competence of the teacher or teachers dealing with such children be constantly assessed. (Wolf gives some favorable statistics on the preparation, experience, and motivation of such teachers in his monograph cited above.) Proper interpretation of the Severity Rating Scale must include the roles played by the child's parents and close relatives and his facility in dealing with others. In short, like other rating scales, it is only one set of measurements among many in a complex situation. But it is useful. It structures judgments that might otherwise be unfair or overlooked. It is experimental, and if used, should be used with care, but it makes data on multiply-impaired children meaningful in terms of what is needed to help them. It is a start anyway, a good start.

NOTES

1. United States Department of Health, Education, and Welfare, Public Health Service, National Center for Chronic Disease Control, Arlington, Va. 22203—HEW-R26.
2. Impaired hearing is defined as "thresholds in excess of ±15 decibels re audiometric zero" in *Hearing Levels of Adults*, National Center for Health Statistics, Series II, No. 26, September, 1967.

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Appendix 4
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